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Bibliography on Soil Temperature, p. 207

Vol. 2 March, 1951 No. 3

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

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B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

SUBSCRIPTION RATE: $5.00 per year to members and non members. Single copies 75¢.

This publication has been made possible through support and sponsorship extended by the Geophysical Research Directorate of the Air Force Cambridge Research Laboratories, under Contract No. A. F. 19 (122) 82. It is published for technical information only and does not represent the recommendations or conclusions of the sponsoring agency.

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 2 MARCH 1951 No. 3

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Soil Temperature

(*For complete table of contents see back cover*)

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN METEOROLOGICAL SOCIETY, 3 Joy Street, Boston 8, Mass.

Printed and issued by: Lancaster Press, Inc.

FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains from 100 to 200 abstracts of current periodical literature and monographs in the fields of meteorology, hydrology, oceanography, etc. These abstracts are arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of from 50 to 250 important references on a special subject without respect to recency of material. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject. Preference is given to recent material, comprehensive works, material from obscure sources, and items with good bibliographies.

Vol. 1, No. 1–11, Jan.–Nov. 1950 carried the following bibliographies: *Atmospheric Pollution, Aerobiology, Cloud Physics and "Rainmaking," Hail, Tornadoes, Volcanic Dust, Climatic Changes, Thunderstorms, Icing, Acoustical Propagation* and *Evaporation.*

Bibliographies published this year were:

1. **Extended Forecasting,** Vol. 2, No. 1, Jan. 1951.
2. **Long Range Forecasting,** Vol. 2, No. 2, Feb. 1951.
3. **Soil Temperature,** Vol. 2, No. 3, March 1951.

Forthcoming bibliographies will be:

4. **Nomograms and Computation Tables,** Vol. 2, No. 4, April 1951.
5. **Climate of the Near East,** Vol. 2, No. 5, May 1951.
6. **Climate of the Middle East,** Vol. 2, No. 6, June 1951.

Other bibliographies in preparation for 1951 are: *Carbon Dioxide in the Atmosphere, Climate and Cancer, Machine Methods in Meteorology, Mountain Meteorology, Objective Forecasting, Radar and Radio Meteorology, Special Winds* and *Turbulence.*

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the June and December issues cumulative indexes are published.

Of making many books there is no end;
And much study is a weariness of the flesh.
ECCLESIASTES, XII, 12

NOTES ON PROGRESS IN METEOROLOGICAL LITERATURE; INTRODUCTION

Over 500 years ago a weary Mesopotamian bibliographer is said to have written words to the effect that "Nowadays, everyone who can read and write, tries to write a book." Evidence supporting this contention was unearthed by archaeologists a number of decades ago, when over 30,000 clay tablets (ca. 2700 B.C.) were found neatly classified and arranged. We do not know if any of these are of meteorological interest.

It is not surprising, therefore, that by the middle of the 17th century A.D. the number of treatises in the several branches of natural philosophy had become so great that a busy scientist could not hope to keep up with all of the latest discoveries in his own, let alone in related fields of knowledge without the aid of some integrating medium. The situation was made even more acute by the rapidly increasing cultural rivalry between such centers as London, Paris, Florence, Milan, Leipzig, etc.

The honor of establishing the first scientific periodical and incidentally the first scientific *abstracting* publication, belongs to DENIS DE SALLO (1626–1669), who issued the first of his weekly reviews called the *Journal des Sçavans* in Paris on Jan. 5, **1665.** The *Journal* immediately became popular and was reprinted in Amsterdam and Leipzig, but was suppressed by the censor from March 30, 1665 to Jan. 4, 1666. A number of items on meteorological subjects are noted in the index for 1665–1750.

On March 6, **1665,** just two months after de Sallo's journal appeared on the continent, the newly formed Royal Society of London issued the first number of the famous *Philosophical Transactions.* While this monthly journal was devoted more to publishing original scientific articles than to reviews or abstracts, the voluminous correspondence of its editor, HENRY OLDENBURG, resulted in the inclusion in the pages of the *Philosophical Transactions* of mention of most of the world's important works in the field of experimental science, including meteorology. The indexes for 1665–1677, 1677–1693, 1665–1700, etc. all show a substantial proportion of the articles to be devoted to meteorology. The index to the abridged *Transactions* for 1665–1700, first published in London in **1705,** lists 144 titles on Meteorology and 86 on Hydrology, and the one for 1665–1780, published in **1787,** lists over 600 on 18 special fields of Meteorology.

Another important center of bibliographic work during the 18th and 19th centuries was *Leipzig.* In **1724,** JULIUS BERNHARD VON ROHR published there a scientific bibliography in which 43 pages were devoted to meteorology. In **1789,** G. R. BÖHMER published a *classified* bibliography with 156 items on *fog, dew, rain, snow, hail* and *ice.* In **1883,** G. HELLMANN published the first *single volume* bibliography on meteorological literature, with nearly 1000 pages and over 8000 items listed by author and subject.

During the 20th century the number of meteorological articles published each year had become so great that *classified* volumes were issued each year or oftener: from 1901–1914 by the Royal Society of London, from 1917–1948 by the Royal Meteorological Society, and from 1921 to date by the French Office National Météorologique and the International Meteorological Organisation.

By making adjustments in the data compiled by G. HELLMANN (1450–1883) and C. E. P. BROOKS (1901–1950) it is possible to estimate the number of items in Meteorology which have been published each year during the past 500 years, and the total accumulation of such material to any given date. (The detailed statistics, and methods of adjusting them, will be published later.)

year	No./yr.	1450 to date	year	No./yr.	1450 to date
1500	5	100	1900	1500	32,000
1600	30	2,100	1920	1250	80,000
1700	50	5,500	1940	1500	120,000
1800	100	12,000	1950	4600	145,000
1850	200	20,000	*1960	5400	195,000

* Estimate based on a slight annual increase.

Extrapolating even further, it is evident that in the next 25 years (by 1975) the volume of meteorological literature will have doubled, unless some radical change in the present trend occurs.

It is to be hoped, therefore, that if *Meteorological Abstracts and Bibliography* has any stimulating effect on the literary fecundity of meteorologists, it will be to improve the *quality* rather than the *quantity* of output. Otherwise the poor librarian, bibliographer or editor of 1975 will agree with the "Ecclesiastic" of 2500 years ago quoted above, and even the specialized research worker will be snowed under by the mass of literature in his narrow field and will succumb to *weariness of flesh.*

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used in this issue may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicats a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5–6):146–151, May–June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5–6 (No. 5 and 6), *pages* 146–151, May–June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

GENERAL METEOROLOGY

2.3–1 551.5:52

Dunham, Theodore, Jr., **Spectroscopic observations of the planets at Mount Wilson.** (In **Atmospheres of the earth and planets,** GERARD P. KUIPER, (ed.) Chicago, University of Chicago Press, [1949]. p. 286–303. 6 figs., 22 refs.) **DLC**—The author summarizes the principal stages in the development of the Caudé spectrograph and reviews the results of spectroscopic observations on the planets that have been made at Mt. Wilson. Attempts were made to verify the presence of CO_2 on Venus and to determine the temperature of its atmosphere. The oxygen and water vapor lines were studied and the absorption bands of Jupiter, Saturn, Uranus and Neptune were investigated. *Subject Headings:* **Planetary atmospheres, Carbon dioxide.**—*I.L.D.*

2.3–2 551.5:52

Herzberg, G., **Laboratory absorption spectra obtained with long paths.** (In **Atmospheres of the earth and planets,** GERARD P. KUIPER, (ed.) Chicago, University of Chicago Press, [1949]. p. 346–354. 2 figs., table, 18 refs.) **DLC**—The author describes an apparatus for obtaining long absorption paths in order to produce experimentally absorption spectra under conditions similar to those prevailing on planets. The absorption spectra of oxygen, carbon dioxide and hydrogen under relatively low atmospheric pressure have been studied by means of long optical paths. The relationship of the spectra thus obtained to the planetary spectra of Venus, Mars and Uranus is discussed. *Subject Heading:* **Planetary atmospheres.**—*I.L.D.*

2.3–3 551.5:06

Johnson, Sir Nelson, **Services rendered to the community by the Meteorological Office.** Royal Meteorological Society, Centenary Proceedings 1950:229–235. 2 figs., table. **MH-BH**—Author lists services to the general public (forecasts), shipping (forecasts, gale warnings), defence forces, civil aviation, public utility services (weather warnings), agriculture, hydrology (flood warnings, water supply), industry (planning, film forecasts, etc.), town planning. A climatic atlas of the British Isles is now being printed. *Subject Headings:* **Meteorological services, Great Britain Meteorological Office.**

2.3–4 551.509 551.5:517.512.2

§Lettau, Hans, **Synoptisch-aerologische Analyse einer 4 tägigen Wetterwelle.** [Synoptic-aerological analysis of a 4-day weather wave.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen,* Ser. 2, 15:107–137, 1949. 8 figs., 10 plates, 6 refs., equations. **DWB**—During the last half of November 1946 a succession of weather situations occurred with a 4-day periodicity in Western Europe. Surface and upper air (Larkhill radiosonde) data are analyzed for this period and presented graphically along with harmonic, synoptic and dynamic analysis of the situation. *Subject Headings:* **Periodicities, Synoptic aerological studies, Western Europe.**—*M.R.*

2.3–5 551.5:523.74

Prudhomme, André, **Le rôle de l'activité solaire dans les phénomènes atmosphériques.** [The role of solar activity in atmospheric phenomena.] *La Météorologie,* 4th Ser., No. 18:85–98, April–June 1950. 4 photos, 29 refs. French, English and Spanish summaries p. 85. **DWB**—Solar constant variations, sun spots, chromospheric eruptions, variations in insolation, mechanism by which solar radiation affects the upper atmosphere and the troposphere, correlations between solar activity and pressure, temperature, precipitation, circulation and climate and finally, solar methods of forecasting weather, discussed. *Subject Headings:* **Weather conditions, Solar influences.**—*M.R.*

2.3–6 551.5:523.8

Huang, Su-shu, **On the Döppler broadening of absorption lines by turbulence and by multiple interstellar clouds.** *Astrophysical Journal*, 112(3):399–417, Nov. **1950.** 2 figs., 3 tables, 11 refs., 89 equations. **MH-BH**—The effect of macroscopic turbulence in the atmospheres of supergiant stars on the formation of absorption lines in the spectra of stellar atmospheres is treated from a different approach than STRUVE and others used heretofore. The velocity distribution of eddies is derived, leading to the probability distribution of velocities in the line of sight, the velocity fluctuations of big eddies caused by small eddies, etc. *Subject Headings:* **Stellar atmospheres, Döppler effect, Turbulence spectrum.**—*M.R.*

2.3–7 551.5:620.19

Walder, V. T., Clarke, W. J., DeCoste, J. B. and Howard, J. B., **Weathering studies on polyethylene.** *Industrial and Engineering Chemistry*, 42(11):2320–2325, Nov. **1950.** 11 figs., 2 tables, 13 refs. **MH-BH**—The effect of weather on polyethylene wire and cable applications is studied by means of an accelerated test, which is described and illustrated. It shows good correlation with natural ageing. Age resistance of polyethylene increases as average molecular weight of polymer is increased. The addition of channel carbon black, with a particle diameter of 25 mμ when well dispersed in a suitable polyethylene at concentrations of 1 to 2 percent, can produce a compound having a resistance to outdoor weathering adequate for most normal conditions. *Subject Headings:* **Industrial meteorology, Corrosion.**—*I.L.D.*

2.3–8 551.5:62:37

Malkus, Joanne Starr, **Meteorology for engineers.** *American Meteorological Society, Bulletin*, 30(9):310–313, Nov. **1949.** 2 figs. **DWB**—Many ways in which an engineer can apply knowledge of meteorology are cited. Also basis on which meteorology course is organized in the Physics Department of the Illinois Institute of Technology is explained. *Subject Headings:* **Industrial meteorology, Teaching of meteorology.**—*M.R.*

2.3–9 551.5:621.3 551.5:69

Brunt, Sir David, **Meteorology and engineering.** Royal Meteorological Society, Centenary Proceedings **1950**:235–238. **MH-BH**—Discusses meteorological aids in generation and transmission of electricity (location and design of power stations to avoid polluting the air, cooling towers, damage to transmission lines, variation of load), wind pressure on structures, heating of buildings. Very general. *Subject Headings:* **Industrial meteorology, Electrical engineering, Building construction.**

2.3–10 551.5:629.13:06

Craig, Robert W., **The Paris Aviation Meteorology meeting.** *American Meteorological Society, Bulletin*, 31(8):284–285, Oct. **1950.** **MH-BH**—Brief report of attendance and officers at combined ICAO and CMAe meeting in Paris during February and March 1950. Action was taken to revise flight information and forecast procedures, to study codes, requirements for climatic data, pressure pattern flying, verification of forecasts, etc. *Subject Headings:* **International organizations, Conventions, Aeronautical meteorology.**—*M.R.*

2.3–11 551.5:92

Editorial. *Indian Journal of Meteorology and Geophysics*, 1(3):177–179, July **1950.** **MH-BH**—This editorial describes S. K. BANERJI'S scientific contribution to meteorology and his professional activities from the beginning of his scientific career to the time of his retirement from the post of Director-General of Observatories in India. *Subject Headings:* **Biography, S. K. Banerji, India.**—*I.L.D.*

2.3–12 551.5(04):33

Vening Meinesz, F. A., **The meteorologist serving the community.** Royal Meteorological Society, Centenary Proceedings **1950**:256–263. **MH-BH**—A general talk on: meteorology and atomic warfare, economic value of forecasts in aviation, agriculture and horticulture (spectacular results in Holland), engineering etc., and the importance of meteorology in war. Ends with a reference to international cooperation. *Subject Headings:* **Meteorological services, Addresses.**

2.3–13 551.5:(05)(029.4)

Gray, Dwight E., **Physics abstracting.** *American Journal of Physics*, 18(7):417–424, Oct. **1950.** 2 figs. **DLC**—Results of 1800 replies out of 2000 questionnaires on use of abstracts sent to physicists (and 300 to librarians) in the United States are tabulated and discussed. Those replying desire the following qualities in order: breadth of coverage, promptness of publication, technical competency of abstracts, extensiveness of indexing and low cost. In *personal interviews* most physicists indicated a desire for *indicative* rather than informative abstracts, whereas 83% of those *answering the questionnaires* desired *informative* rather than indicative abstracts. However, only 6% of those replying use the abstract as a substitute for the original paper. About one out of three in the United States uses U.D.C. numbers, whereas the percentage abroad is higher. *Subject Headings:* **Periodicals, Abstracting, Physics abstracts.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

2.3–14 551.501.7:551.557

Vialar, J., **Abaque pour la détermination des vents géostrophique et du gradient.** [Graph for determining geostrophic and gradient winds.] *Journal Scientifique de la Météorologie*, 2(8):131–141, Oct.–Dec. **1950.** 6 figs., fold. graph, 12 equations. French, English and Spanish summaries p. 131. **MH-BH**—The usual theory of geostrophic and gradient winds is developed logically and illustrated by schematic diagrams. Several hourly gradient wind scales are compiled therefrom and presented in a fold-in chart. Finally, the use of the scales is described and the relation between pressure gradient and geopotential gradient discussed and illustrated. *Subject Headings:* **Gradient wind scales, Nomograms.**—*M.R.*

2.3–15 551.506(26)

Williams, C. H., **An old meteorological log.** *Marine Observer*, 20(150):236–238, Oct. **1950.** fig. **MH-BH**—Notes from log of the *Waitara*, New Zealand to London, 1876. *Subject Headings:* **Observational data, Marine meteorology, Ships' logs.**

2.3–16 551.506.8

Sekiguchi, T., **Local climatological study of the 80% flowering dates of cherry blossom (*prunus subhirtella*) at the Akaho Fan, Kami-ina, Nagano Pref.** *Geophysical Magazine*, Tokyo, 22(2):89–97, Nov. **1950.** 5 figs., 4 refs. In English. **MH-BH**—Speed of movement of isophenes of flowering date for cherry blossoms from valleys to peaks is about 5 days for 100 m. height. Data for sheltered or exposed places (southerly or northerly exposures) are plotted and a regression line drawn. *Subject Headings:* **Phenology, Japan.**—*M.R.*

2.3–17 551.506.8:633.1

Daigo, Y. and Suzuki, Y., **The limit of aquatic-rice culture in Japan.** *Journal of Meteorological Research*, Tokyo, 2(7):197–198, July **1950.** fig., 2 tables. In Japanese, English summary p. (3). **DWB**—Tables and a chart of Japan show the number of days when the average daily minimum air temperature is favorable for rice growing, and the average limits at various places. The limits are determined by taking actual temperature conditions which occur in Hokkaido—the northern limit of rice culture—at the average sowing time (May 15) and the harvest time (Oct. 15), and applying these criteria to the rest of Japan. *Subject Headings:* **Phenology, Agronomy, Japan.**—*M.R.*

INSTRUMENTS

2.3–18 551.508:632.111.3

Büdel, Auguste, **Untersuchung der Wärmeschutzwirkung von Gittern und Pflanzen.** [Investigations of the insulating effect of screens and plants.] *Germany, Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 4(1), **1938.** 24 p. 17 figs., tables, 26+refs., 9 equations, append. **DLC**—The heat insulating effect of screens is investigated by determining their effect upon heat loss from a frigorimeter through radiation, conduction and convection. An equation for estimating the radiation insulating effect of screens is developed.

The experimental procedure and method of calculation are described. In the case of close and wide meshed spherical iron screens and close meshed cylindrical screens, the heat transfer number of a sphere, at wind velocities 4 to 11 m.p.s., is a constant proportion, independent of the wind velocity, or the heat transfer number of an unprotected sphere; insulating effect is greater at lower wind velocities. Wide meshed screens provided slight protection against heat loss through conduction and convection; their radiation insulating effect is important at very low wind velocities. Insulating effect of spherical and cylindrical screens diminishes with increasing distance. The heat insulating effect of plants and of clothing is considered. *Subject Headings:* **Instrument shelters, Clothing climate, Agricultural climatology.**—*I.L.D.*

2.3–19 551.508:77:551.579

Daigo, Y. and Maruyama, E., **The remarks on the observation of precipitation for flood forecasting.** *Journal of Meteorological Research*, Tokyo, 2(7):191–196, July **1950.** 7 figs., 4 tables, 12 refs. In Japanese, English summary p. (3). **DWB**—A statistical study of the effectiveness of rain gages in catching a representative sample of the rainfall which could be used in flood forecasts or design of reservoirs, etc. It was found that only 31% of the possible catch was recorded during strong winds, and that the smaller the raindrops, the smaller the percentage catch when strong winds occurred. *Subject Headings:* **Rain gages, Instrumental errors, Flood forecasting.**—*M.R.*

2.3–20 551.508.21

Bener, Paul, **Untersuchung über die Wirkungsweise des Solarigraphen Moll-Gorczynski. Beiträge zur Strahlungsmessmethodik III.** [Investigation of the principle of the Moll-Gorczynski solarigraph. Contributions to radiation technique III.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(3):188–249, **1950.** 20 figs., 6 tables, 28 refs., 97 equations. German, English and French summaries p. 188–189. **DWB**—The M.-G. solarigraph records the total radiation from sun and sky on a horizontal surface. The errors of calibration are investigated theoretically and experimentally by studying the heat balance; they are approximately, in %: temperature coefficient 0.2/°C.; loss by reflection and absorption in glass cover up to 0.4; errors in global radiation from disregarding solar height 0.5; from disregarding azimuth up to 2.6 (sun above 15°) but up to 16 (sun below 15°); errors of galvanometer system 0.5. The total error is estimated as ±1–2%. *Subject Headings:* **Sunshine recorders, Radiation balance.**—*C.E.P.B.*

2.3–21 551.508.54

Raab, Lars, **A direct indicating anemometer.** *Arkiv för Geofysik*, 1(5):117–121, **1950.** 6 figs., ref., 3 equations. **DWB**—An electric wiring and recording device is described which will make it possible to record the actual wind speed on a chart, even though a contact anemometer is used. Circuits, calibration curves, sample record and theoretical developments are illustrated. The device is based on the principle that varying frequency of short circuits creates a varying voltage output. *Subject Headings:* **Anemometers, Wind recording instruments.**—*M.R.*

2.3–22 551.508.71:551.508.1

Diem, M., **Messung der Feuchtigkeit in der freien Atmosphäre mit Hilfe des Taupunktes.** [Humidity measurements in the free atmosphere by means of the dew point.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(4):436–466, **1950.** 21 figs., 5 tables, 31 refs., equations. German, English and French summaries p. 436–437. **DWB**—After briefly summarizing other methods of measuring humidity and their errors, the author describes a new dew point apparatus developed at Ainring, Bavaria, in which air passes a thermometer and a speculum mirror, the temperature of which can be controlled. The mirror reflects light from a lamp on to a photo-cell (diagrams show principles). The heat exchange with the mirror is discussed. Various forms of thermometers (mercury, bimetallic, resistance, thermo-element) were tried; the thermo-element gave the least lag. A technique was developed for standardizing against an aspiration psychrometer. A number of records obtained in flight are illustrated; they show great detail owing to small lag, and the apparatus was successful under all conditions. The last section describes researches into the process of condensation

on different metals. At temperatures of 0 to −20°C. crystals are formed (as well as droplets) on "freezing nuclei" in haze layers. Below −20°C. only ice crystals are formed. *Subject Headings:* **Humidity measurements, Dew point recorders.**—*C.E.P.B.*

2.3–23 551.508.82 551.507.321.2

Parrott, William H., Paquette, Robert G. and Church, Phil E., **A meteorograph for low altitude sounding.** *American Meteorological Society, Bulletin,* 31(9):336–340, Nov. 1950. 3 figs., 5 refs. **MH-BH**—This article is a description of a mechanical direct recording meteorograph for captive-balloon soundings of temperatures in the lower 600 meters of the atmosphere. The principle of this instrument is a pressure element which drives a recording sheet under a pen arm which is controlled by the second variable. The design and construction of the meteorograph and of the sounding equipment are described in detail and illustrated with photographs. The procedure for calibration and method of taking observations are given. *Subject Headings:* **Meteorographs, Radiosondes, Captive balloons.**—*I.L.D.*

2.3–24 551.508.822(02)

Radiosonde AN/AMT-2A. Washington, D. C., U. S. Govt. Printing Office, 1950. 42 p. 15 figs., append. (U. S. Dept. of the Army Technical Manual TM 11-2433) **DWB**—A complete, illustrated manual for calibration, base-lines, launching and evaluating the records from the radiosonde (developed by the U. S. Signal Corps and used at Air Force and Navy aerological stations). The care and installation of storage batteries, balloons and other equipment is treated and samples of evaluating charts or diagrams included. Details of elements are shown in photographs and diagrams included to show the overall mechanism. *Subject Headings:* **Radiosondes, Upper air observations, Observers manuals.**—*M.R.*

2.3–25 551.508.822

Sittel, Karl and Menzer, Ernst, **An improved fully electric radiosonde.** *American Meteorological Society, Bulletin,* 31(9):341–346, Nov. 1950. 5 figs., table, 8 refs. **MH-BH**—The authors describe the construction and operation of a fully electric radiosonde based upon the principle developed by VÄISÄLÄ of Finland. The measuring elements are condensers whose capacities depend upon meteorological variables, and the difference of the squares of the wave lengths of the measuring and reference capacities is a single-valued function of the meteorological variable. The temperature is measured by the change of dielectric constant of the condenser; the humidity by determining the psychrometric difference; and the pressure by means of a corrugated diaphragm which positions a cylindrical condenser. A photograph and a diagram of the apparatus are given and its calibration is outlined. Four types of this sonde were tested. The results of a comparison of temperature measurement with other sondes are given. *Subject Heading:* **Radiosondes.**—*I.L.D.*

2.3–26 551.508.952:551.510.4:551.506.5

Konstantinova-Shlezinger, M., **Fluorestsentnyĭ metod opredeleniia soderzhaniia ozona v vozdukhe.** [The fluorescent method of determination of the ozone content in the air.] (In Trudy Elbruskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow 1936. p. 49–60. 3 figs., 3 tables. English summary p. 60. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery,* Tom II]) **DLC**—Instrumentation described and calculation given for ozone measurements made during analysis of the surface air at several different heights on Mt. Elbrus. *Subject Headings:* **Ozonometers, Ozone measurements, Elbrus Expedition, U.S.S.R.**—*M.R.*

SYNOPTIC ANALYSIS AND FORECASTING

2.3–27 551.509.3

Elliott, Robert D., Olson, Clifford A. and Strauss, Milton A., **Analysis of replies to a questionnaire on forecast aids.** *American Meteorological Society, Bulletin,* 30(9):314–318, Nov. 1949. 3 figs., 5 tables. **DWB**—Tabulations show "usefulness and use" of 20 different charts by Navy, Air Force, Weather Bureau and airlines and by experience of analysts, based on an analysis of 1460 replies from the professional meteorological personnel of these services.

Summary shows that there is little significant difference in use of charts in analysis and forecasting and that differences are largely due to varying requirements and availability of data (Navy uses upper level charts to a lesser extent than other outfits). Only minor differences appear in experience of different analysts when comparing the use of various aids. *Subject Headings:* **Forecast aids, Synoptic charts.**—*M.R.*

2.3–28 551.509.3:551.575

*George, J. J., **Further studies in air mass fog at Atlanta. Part I—Advection fog.** [Atlanta, Eastern Air Lines, Inc., Meteorological Dept., **1948.**] 8 leaves. 4 figs., table, 2 refs. (Mimeographed) **DWB. Part II—Radiation fog.** *Ibid.* 10 leaves. 2 figs., 4 tables, ref. (Mimeographed) **DWB**—Data for April 1945–Oct. 1948 for all types of air mass fog are tabulated, analyzed and classified, and the results used to furnish additional or more refined objective forecasting rules and tools for Atlanta, than were contained in the author's 1939 paper on fog forecasting at Atlanta. As usual the catalogue of cases and the derived scatter diagrams which proved useful, are presented. *Subject Headings:* **Fog forecasting, Objective forecasting, Radiation fog, Atlanta, Georgia.**—*M.R.*

2.3–29 551.509.3:551.575:629.13

*§Hilworth, J. T., **Low ceilings and visibilities at Birmingham, Alabama.** Atlanta, Eastern Air Lines, Inc., Meteorological Dept., **1947.** 21 leaves. 10 figs., 4 tables. (Mimeographed) **DWB**—A typical J. J. GEORGE type of objective or local synoptic forecast study for Birmingham, not as comprehensive as those for Atlanta, Jacksonville, etc., but carefully prepared on the basis of 5 years (1940–45) of airways weather observation, and condensed so that it is easy to use as a forecast aid. The basic statistics, sample synoptic charts and scatter diagrams which show the dependability of the selected parameters as forecast criteria, are included. *Subject Headings:* **Objective forecasting, Fog forecasting, Airways forecasting, Birmingham, Alabama.**—*M.R.*

2.3–30 551.509.3:551.577

Martin, Donald E. and Hawkins, Harry F., Jr., **Forecasting the weather—The relationship of temperature and precipitation over the United States to the circulation aloft. Studies of winter precipitation.** *Weatherwise*, 3(6):138–141, Dec. **1950.** 8 figs. **MH-BH**—The use of composite "wet" and "dry" maps for forecasting rainfall is discussed and illustrated by charts prepared for Norfolk, Va., Fort Worth, Tex. and Eureka, Calif. Parameters used are 5-day average 500 mb. contours for North America and thickness (departure from normal) associated with the 10 wettest and 10 driest (for the station in question) periods in 3 winters. *Subject Headings:* **Objective forecasting, Precipitation forecasting, Extended forecasting, United States.**—*M.R.*

2.3–31 551.509.3:551.575

*§Roche, R. D., **Spring, summer, and fall pre-warm frontal weather at La Guardia.** Atlanta, Eastern Air Lines, Inc., Meteorological Dept., **1948.** 26 leaves. 8 figs., 8 tables, 4 refs., 3 appends. (Mimeographed) **DWB**—Data for the months of April through November 1940–1947 were used to determine the conditions which would justify a forecast of low ceiling in advance of warm fronts. (The last two years of record were reserved for an independent check or verification of the forecasts based on the first 6 years of data.) Many carefully worked out charts are included to aid the forecaster in establishing whether or not ceiling and visibility will go below minimum, time of closing and time of lifting of ceiling. *Subject Headings:* **Objective forecasting, Airways forecasting, La Guardia Field, New York.**—*M.R.*

2.3–32 551.509.3(52)

§Saito, S., **On utilization of weather observations on Mt. Tsurugi to weather forecasting at Osaka.** *Journal of Meteorological Research*, Tokyo, 2(7):204–208, July **1950.** 3 figs. In Japanese, English summary p. (4). **DWB**—By careful analysis of reports from Mount Tsurugi, the passage of upper troughs over southern Japan can be anticipated, with consequent improvement in forecasts for Osaka. Three such synoptic situations are discussed and illustrated. *Subject Headings:* **Mountain observations, Local forecasting, Osaka, Japan.**—*M.R.*

2.3–33 551.509.31

§Cheng, Chwen-shu, **Chinese synoptic weather patterns.** Shanghai Observatory, 1949. 116 p. tables, charts. In English. **MH-BH**—A description of the synoptic situations during winter, spring, summer and autumn in China, and an analysis of the twelve most important synoptic patterns that characterize the weather of China. The development of each pattern is illustrated by synoptic charts. The patterns are as follows: polar outbreaks and wave disturbances, regeneration of rainy weather in the cold air region and cyclogenesis, weak cold fronts, wave disturbances, cyclogenesis in the west of the trough formed behind on east moving anticyclone [trough along the Nan Ling (Ranges) and trough along Taiwan Strait], large scale Pacific trough in winter, regeneration of an old occluded low from northwest China, summer cold outbreak, summer pattern, extreme summer pattern, tropical low in the Pacific and north moving rainbelt in the summer monsoon. *Subject Headings:* **Synoptic analysis, China.**—*I.L.D.*

2.3–34 551.509.31

§Wobus, Hermann B. and Norton, Lewis C., **Some synoptic aspects of a change in weather regime during February 1950.** *Monthly Weather Review*, 78(2):31–40, Feb. 1950. 16 figs., 4 refs. **DWB**—The sequence of events at the surface and in the upper atmosphere which led to the change from abnormal (very cold in west and very warm in east) weather to more normal conditions, is analyzed and illustrated by numerous synoptic charts for the period Feb. 8–16, 1950. Emphasis is placed on changes in anomalous circulation patterns which would give clues for the short range forecaster, rather than toward explaining the anomalies or changes in circulation. *Subject Headings:* **Synoptic analysis, Abnormal winters, United States.**—*M.R.*

2.3–35 551.511:551.509.312

Godson, Warren L., **Synoptic significance of dynamic instability.** *Journal of Meteorology*, 7(5):333–342, Oct. 1950. 7 figs., 9 tables, 7 refs., 11 equations. **MH-BH**—Four types of perturbed motions (stable and unstable) are treated theoretically and the criteria tested synoptically with respect to 500 mb. chart developments. The distribution of stability and instability across polar fronts is discussed (only one quarter of all cases studied show dynamic stability) and the consequences of variations in stability with distance from the front outlined. Especial emphasis is placed on prognostic implications of theory. *Subject Headings:* **Upper air analysis, Dynamic instability.**—*M.R.*

2.3–36 551.509.317:551.547

§Bundgaard, R. C., **A note on the individual changes in the thickness of isobaric layers.** Royal Meteorological Society, Centenary Proceedings 1950:113–117. 2 figs. **MH-BH**—Describes prognosis of thickness of an isobaric layer by non-advective and non-adiabatic extrapolation from quasi-conservative changes in progress. These are due to vertical motion and to temperature changes by condensation or evaporation, conduction and radiation. Illustrated by analysis of chart for 5.1.1949. *Subject Headings:* **Differential analysis, Baric topography.**

2.3–37 551.509.317

Pramanik, S. K. and Sreevastava, S. N., **Pibals in forecasting.** *Indian Journal of Meteorology and Geophysics*, 1(3):247–248, July 1950. 2 tables. **MH-BH**—Pibal data for Calcutta, Lahore and Madras were examined in order to determine to what extent their direction and variation with height can help in forecasting improvement or deterioration in local weather as regards occurrence of rain. It is concluded that data on variations of upper wind directions with height up to 10,000 ft. over these stations are not useful in forecasting rain. *Subject Headings:* **Pilot balloon observations, Precipitation forecasting, India.**—*I.L.D.*

2.3–38 551.509.317:551.515.4

Ray Choudhuri, S. N., **A note on some additional factors that may be found useful in interpreting thermodynamic diagrams for thunderstorm liability.** *Indian Journal of Meteorology and Geophysics*, 1(3):248–251, July 1950. 2 figs., 5 refs. **MH-BH**—A brief critical discussion of the use of the tephigram. The parcel method and "entrainment" method in

studying the thunderstorm liability of upper air regions in India and of the role of vertical shear in inhibiting thunderstorms. *Subject Headings:* **Tephigrams, Thunderstorm forecasting. Aerological diagrams, India.**—*I.L.D.*

2.3–39 551.509.33:551.506:519.2

Kosak, Erwin, **Die Erhaltungstendenz meteorologischer Elemente und ihre rechnerische Erfassung.** [The persistence tendency of meteorological elements and its numerical calculation.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(3):259–278, 1950. 7 figs., 17 tables, 17 equations. German, English and French summaries p. 259–260. **DWB**—Persistence is measured by autocorrelation r between successive observations. Short methods for finding r are described (one needs only variability of monthly means and interdiurnal change). In daily mean temperature of Vienna, r varies from .873 in Feb. to .707 in Aug. Applications include: regression formula to give probable temperature departure on any day, correlation between means of n successive days, high correlation between individual days (especially near mid-month) and monthly means, probable duration of periods exceeding a given temperature (of interest in study of singularities). An interesting statistical study. *Subject Headings:* **Persistence, Statistical analysis.**—*C.E.P.B.*

2.3–40 551.509.54

Douglas, R. H., **"-and a few scattered showers."** *Weather*, 5(11):378–380, Nov. 1950. **DWB**—Humorous explanation of meaning of "scattered showers." *Subject Heading:* **Forecast terminology.**

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

2.3–41 551.510:621.396.11

Jones, F. E. and Cornford, E. C., **The measurement of the velocity of propagation of centimetre radio waves as a function of height above the earth. Part 2.** *Institution of Electrical Engineers, Proceedings*, Part 3, 96(43):447–452, Sept. 1949. 8 figs., 7 tables, 5 refs., 6 equations. **DLC**—Includes nomogram for computing variation of refraction index of atmosphere with height above earth. Velocities given for propagation between ground and 10, 20 and 30 thousand feet respectively (186,233; 186,246; and 186,256 miles/sec.). *Subject Headings:* **Radio transmission, Atmospheric structure.**—*M.R.*

2.3–42 551.510.3:551.501.42

Williams, Nelson R., **The calculation of air density in various units.** *American Meteorological Society, Bulletin*, 30(9):319–320, Nov. 1949. table, 6 refs., equations. **DWB**—The author has worked out values for computing air density in various units and presents them in a table, with examples of application to solution of various practical problems in meteorology, engineering, etc. *Subject Headings:* **Atmospheric density, Computation tables.**—*M.R.*

2.3–43 551.510.4 551.506.5

*Balakov, V. V., Vafiadi, V. G. and Krivich, S. S., **Izmerenie kontsentratsii atmosfernogo ozona metodom pogloshcheniia ultrafioletovykh luchei.** [Measurements of ozone content by the ultraviolet absorption method.] (In Trudy El'bruskoĭ Ekspeditsii Akademii Nauk, SSSR i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, 1936. p. 109–116, 4 figs., 10 refs., equations. English summary p. 116. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II]) **DLC**—Measurements were made at 2200 and 4500 m. elevations on Mt. Elbrus by photographing the spectrum of mercury with a quartz prism. Instruments described and illustrated, and measurements at different elevations plotted on a scatter diagram. *Subject Headings:* **Mountain meteorology, Ozone measurements, Elbrus Expedition, U.S.S.R.**—*M.R.*

2.3–44 551.510.4:551.583

Kramer, C., **Nogmaals: het koolzuurgas in de atmosfeer en het klimaat.** [Again: Carbon dioxide in the atmosphere, and climate.] *Hemel en Dampkring*, 48(11):189–191, Nov.

1950. ref. **DLC**—It is pointed out that the quantity of CO_2 produced by the photosynthetic processes of plants in about three days is greater than that produced by man's industrial activity in an entire year. The carbon reserves and CO_2 equilibrium in the troposphere, biosphere, hydrosphere and lithosphere are discussed. The CO_2 equilibrium can be disturbed over short periods, such as several centuries, so that CO_2 content of the atmosphere may increase temporarily and a warming up of the climate may result. *Subject Headings:* **Atmospheric composition, Carbon dioxide, Climatic changes.**—*I.L.D.*

2.3–45 551.510.42:551.551

Sutton, O. G., **The dispersion of hot gases in the atmosphere.** *Journal of Meteorology*, 7(5):307–312, Oct. **1950.** 4 figs., 2 tables, 6 refs., 12 equations. **MH-BH**—Behavior of a gas stream or jet in calm air and with horizontal wind movement is considered theoretically and the results compared with empirical data obtained in the laboratory by SCHMIDT. Finally, the effect of adding heat to a pollution source is formulated with the conclusion that in the absence of high winds, adding heat to the source has the same effect as increasing the height of the stack. *Subject Headings:* **Atmospheric pollution, Turbulence.**—*M.R.*

2.3–46 551.510.42:551.521.31

Wexler, Harry, **The great smoke pall—September 24–30, 1950.** *Weatherwise*, 3(6):129–134, 142, Dec. **1950.** 5 figs., photo, 5 refs. **MH-BH**—A preliminary, illustrated report on the upper air circulation and radiation conditions attending the spread of forest fire smoke from the Canadian Rockies across the eastern U.S.A. and Canada to Europe. Isentropic trajectories and 700 mb. mean 5-day charts are presented. *Subject Headings:* **Smoke pall—Sept. 1950, Blue sun, General circulation, Air trajectories.**—*M.R.*

2.3–47 551.510:42:612

Woodcock, Alfred H., **Note concerning human respiratory irritation associated with high concentrations of plankton and mass mortality of marine organisms.** *Journal of Marine Research*, 7(1):56–62, **1948.** fig., table, 20 refs. **DLC**—The author presents evidence that the *dinoflagellate Gymnodinium* sp. produces an irritating effect upon respiration when present in high concentrations in the atmosphere. Qualitative subjective tests are listed which show that the respiratory irritation is associated with the presence of small drops of "red water" or sea water discolored by high concentrations of dinoflagellates, in the inhaled air. *Subject Headings:* **Atmospheric pollution, Aerobiology Respiratory diseases.**—*I.L.D.*

UPPER ATMOSPHERE—IONOSPHERE

2.3–48 551.510.52:551.524.7:551.547.3(82)

Schwerdtfeger, Werner, **Bemerkungen zu der Arbeit von H. Hoinkes, "Die interdiurnen Änderungen von Druck und Temperatur . . ." diese Zeitschrift, Ser. A, Band II, S. 239ff.** [Remarks on the work of H. Hoinkes "The interdiurnal changes of pressure and temperature . . ." in this periodical, Ser. A, 2:239ff.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(4):467–468, **1950.** 2 tables. (*See item* 7–31 in July 1950 *Meteorological Abstracts*) **DWB**—Gives correlations varying from −.17 (June) to −.71 (Dec., Feb., March) between interdiurnal changes of mean daily pressure and temperature at La Rioja (W. Argentina). High-level stations show that the correlation becomes positive above 3000 m. *Subject Headings:* **Interdiurnal temperature variations, Upper air pressure, Argentina.**—*C.E.P.B.*

2.3–49 551.510.53(03)

Chapman, Sydney, **Upper atmospheric nomenclature.** *American Meteorological Society, Bulletin*, 31(8):288–290, Oct. **1950.** 3 figs., 2 refs. **MH-BH**—Proposed to limit term *stratosphere* to isothermal region just above tropopause and to introduce *mesosphere, thermosphere; stratopause, mesopeak* and *mesopause*; *mesoincline, mesodecline* and *thermoincline;* and *homosphere, homopause* and *heterosphere* for various aspects of the standard atmospheric profile, or of the atmospheric composition. *Subject Headings:* **Stratosphere, Glossaries.**—*M.R.*

2.3–50 551.510.53:551.524.7:551.521.3:551.558

Goody, R. M., **The experimental determination of the thermal state of the lower stratosphere.** Royal Meteorological Society, Centenary Proceedings 1950:9–18. fig., 25 refs., equations. **MH-BH**—Describes measurements of spectra 5.3–7.7μ at 20,000–30,000 ft., above most of the water vapor, and discusses the possibility of measurements of the total radiation. Also considers estimates of turbulence near tropopause from distribution of gases in the stratosphere. Simple measurements from balloons and aircraft would help in understanding thermal processes of the stratosphere. *Subject Headings:* **Structure of the stratosphere, Upper air temperatures.**

2.3–51 551.510.53:551.524.7

Strong, John and Plass, Gilbert N., **The effect of pressure broadening of spectral lines on atmospheric temperature.** *Astrophysical Journal*, 112(3):365–379, Nov. **1950.** 4 figs., table, 4 refs., 32 equations, 2 append. **DLC**—Importance of line width for radiative cooling is shown in schematic diagram of thermal structure of earth's atmosphere (up to 40 km.). Transmission at 33,000 ft. from 8 to 26μ shows anomalous bands due to absorption by CO_2, O_3 or H_2O. As a result of data obtained for this study, the radiative balance of the stratosphere is revised. Heat loss from stratosphere in the above bands is balanced by heat gained by absorption of terrestrial radiation in the same bands and by absorption of UV solar radiation by O_3. *Subject Headings:* **Structure of the stratosphere, Upper air temperatures, Radiation balance.**—*M.R.*

2.3–52 551.510.535

Kirkpatrick, C. B., **The influence of vertical ionic drift on a "Chapman region."** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 1(4):423–442, Dec. **1948.** 8 figs. (1 fold.), 4 tables, 5 refs., 67 equations. **MH-BH**—A highly theoretical treatment of the vertical transport of ions in an ionized region by a computation of the electron distribution in a static layer and in a "moving" layer, respectively. The theory is then applied to a "Chapman Layer" of the E region, and the deviation between theoretical and actual ionic drift considered. Conclusion is that this drift is caused by solar tides in the ionosphere and that ionic drift has little influence at night. *Subject Headings:* **Ionospheric layers, Atmospheric tides.**—*M.R.*

2.3–53 551.510.535

Veldkamp, J., **De ionosfeer op een winterdag.** [The ionosphere on a winter day.] *Hemel en Dampkring*, 48(11):181–189, Nov. **1950.** 6 figs., 2 refs., equation. **DLC**—This is a non-technical discussion of the mode of origin of the various ionic layers of the atmosphere. The methods used to investigate the ionosphere and their underlying theoretical assumptions, the interpretation of ionospheric measurements and the characteristics of the ionosphere on a particular winter day are stated. *Subject Heading:* **Ionospheric layers.**—*I.L.D.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

2.3–54 551.511(26)

Charnock, H., **Recent advances in science. Meteorology. Energy transfer between the atmosphere and the ocean.** *Science Progress*, 39(153):80–95, Jan. **1951.** 4 figs., 21 equations, 33 refs. **DLC**—The energy balance of the oceans is discussed under: radiation from sun and sky, evaporation (generally estimated from $k\bar{h}\,[1-.071C]$ where $\bar{h}$ is mean altitude of sun and C cloud in tenths), reflected radiation, effective back radiation, heat storage and advection and Bowen's ratio of heat used for evaporation to sensible heat. The turbulence theory is then applied to energy transfer. The determination of the important factor, surface stress, from wind profile is especially difficult over the sea, partly because the form of the profile is not certain and partly because the datum plane for zero velocity is vague. An expression for evaporation in neutral stability is given; under other conditions no method of computing evaporation or heat flux is available. The aerodynamic character and roughness parameter of the sea surface are discussed. In spite of difficulties, estimates of energy transfer from ocean to atmosphere by Jacobs, Albrecht, Wexler and Bowden are in general agreement, and local maximums correspond with maximum cyclogenesis. *Subject Headings:* **Energy exchange, Oceans.**—*C.E.P.B.*

2.3–55 551.511:551.584

Jehn, K. H. and Gerhardt, J. R., **A preliminary study of the eddy transfer of heat near the earth's surface.** *Journal of Meteorology*, 7(5):343–346, Oct. **1950.** 5 figs., 5 refs., 5 equations. **MH-BH**—Results of studies made at the Manor Micrometeorological Field Station in Texas on Aug. 3 and 4, 1948 compared with data obtained in Southern Arizona and at Leafield, England, on the time and height distribution of eddy conductivity as calculated from the temperature, moisture and wind from the ground up to 300 ft. The equation of eddy heat-transfer is developed, the heat transfer at the soil surface discussed and finally, the diurnal variation of K_H calculated for several levels. *Subject Headings:* **Micrometeorology, Eddy diffusion, Texas, Arizona.**—*M.R.*

2.3–56 551.511

Masuda, Y., **On the resonance of pressure waves and temperature waves.** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(5):139–148, May **1950.** 9 figs. In English. **DWB**—Extending the work of Defant and Philipps, author studies effect of an upper air pressure and surface temperature wave on a surface pressure wave. He obtains a differential equation, the solution of which shows that in certain conditions resonance between the pressure and temperature waves may occur. A typical example is assumed and the evolution followed over 9 days. *Subject Headings:* **Resonance, Pressure waves.**—*C.E.P.B.*

2.3–57 551.511:532

Townsend, A. A., **Local isotropy in the turbulent wake of a cylinder.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 1(2):161–174, June **1948.** 11 figs., 8 refs., equations. **MH-BH**—Preliminary measurements were made at 80, 120 and 160 diameters downstream from a cylinder .953 cm. diameter in an air stream 13 m./sec. in order to test Kolmogorov's theory of local isotropy. Regions of turbulent flow are separated by sharp boundaries from regions of laminar flow, and within the turbulent regions local isotropy actually exists. Theory is developed, instrumentation described and illustrated and data shown on graphs to illustrate "intermittency factor" variations. *Subject Headings:* **Turbulence, Kolmogorov's theory.**—*M.R.*

2.3–58 551.511:532

Townsend, A. A., **The fully developed turbulent wake of a circular cylinder.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 2(4):451–468, Dec. **1949.** 12 figs., 14 refs., 3 equations. **MH-BH**—A detailed summary of work done by the author during the past year and based on extension of laboratory work of Chou (1945), Corrsin (1947), Dryden (1948) and the author (1947, 1948 and 1949) using the statistical theory of turbulence to supply deficiencies in Prandtl-Taylor formulations when considering turbulent transport of momentum, energy and heat in the wake of obstacles in the path of moving streams of air. It was found that the requirements of the dynamical similarity hypothesis were approximated between 500 and 950 diameters from the cylinder (8 to 16 m. behind a cylinder 1.6 mm. in diameter). Observed values in this area are plotted to show goodness of fit to theoretical curves of universal functions. Mean velocity distribution, energy diffusion rates, intermittency factors, dissipation length parameter, energy balance, convection of energy, jet convection and gradient diffusion values shown graphically. *Subject Headings:* **Turbulent exchange, Fluid mechanics.**—*M.R.*

2.3–59 551.511:551.501.6

Williams, Archie F., **A "geostrophic map."** *American Meteorological Society, Bulletin*, 31(9):315–317 Nov. **1950.** fig., table, 13 equations. **MH-BH**—Geostrophic wind computation can be facilitated by using a map the scale of which is proportional to the sine of the latitude; for a given distance between two isobaric contours they represent the same geostrophic wind speed at all latitudes. A method for constructing a "geostrophic map" is prescribed and an example of such a map is given. The errors resulting from the fact that the map is not conformal at certain latitudes are analyzed and it is shown that a fairly adequate map can be obtained for latitudes 30° to 60°. A method for constructing a geostrophic wind scale for use in conjunction with the "geostrophic map" is presented. *Subject Headings:* **Geostrophic wind scales, Graphical presentation.**—*I.L.D.*

GENERAL CIRCULATION

2.3–60 551.513:551.583.3

Kosiba, Aleksander, **Niektore zagadnienia ogolnej cyrculacji atmosferycznej.** [Some problems of atmospheric circulation.] *Czasopismo Geograficzne*, Lodz, Poland, 20(1–4):59–80, 1949. 4 figs., 48 refs. English summary p. 80. **DLC**—Discusses recent work on the atmospheric circulation in the zone of westerlies up to very high levels and its bearing on variations of climate. The latter depend on the position in regard to centers of high and low pressure and their dynamic or thermal origin. During the Quaternary glaciation the thermal contrasts were greater, especially across Europe and the Alps to the Mediterranean, and this caused modifications in the circulation. *Subject Headings:* **Zonal circulation, Climatic variations, Europe.**—*C.E.P.B.*

2.3–61 551.513.1

Eady, E. T., **The cause of the general circulation of the atmosphere.** Royal Meteorological Society, Centenary Proceedings 1950:156–172. 3 figs. **MH-BH**—The paper aims to set out the basic principles of the atmospheric circulation. There is a poleward and upward heat transfer and a transfer of angular momentum from poles and equator towards mid-latitudes. These cannot be due to steady currents, and large scale turbulence must be fundamental. Steady baroclinic flow is unstable, and since turbulence produces heat transfer this may be the basic cause of atmospheric motion; the order of magnitude is correct. Transfer of angular momentum is secondary. Conservation of the vertical component of absolute vorticity leads to incorrect results. Surface friction is necessary to drive meridional circulations, which are also secondary effects in heat transfer. *Subject Headings:* **General circulation, Turbulence.**

2.3–62 551.513.1:551.515

Petterssen, Sverre, **Some aspects of the general circulation of the atmosphere.** Royal Meteorological Society, Centenary Proceedings 1950:120–155. 25 figs., 10 refs., 12 equations. **MH-BH**—Author defines atmospheric circulation as "maintenance of the basic current and of the patterns shown by the ensemble of moving cyclones and anticyclones." The mean meridional structure up to 20 km. is set out in winter and summer—temperature and potential temperature, zonal component of geostrophic wind, distributions of relative and absolute vorticity. The vorticity equation and short term variations of vorticity are discussed. He then explores the balance between sources of vorticity and of heat and cold. Relative cyclonic vorticity is exported from a continent or icefield centered at the pole to a sub-polar cyclonic belt; the complications due to asymmetry in the Northern Hemisphere are superposed on this and cause Icelandic and Aleutian Lows. In mid-latitudes cyclones move poleward while anticyclones are in equilibrium in lower latitudes. The trade wind belt is also a source of vorticity, part of which is supplied to the doldrums and part to the westerlies. The upper troposphere, cold and at low pressure, maintains a circulation across the isentropic surfaces, except in continental winter inversions which act as a brake. Sources of vorticity also occur in the lee of mountain ranges. The theoretical results agree with frequencies of cyclones and anticyclones, cyclogenesis and anticyclogenesis, for which mean meridional sections and Northern Hemisphere frequency charts are shown. The latter show the zonal pattern and the effect of mountain ranges, inland water, the subpolar semipermanent lows and the monsoons. Travelling disturbances, shown by the rate of alternation between cyclones and anticyclones, concentrate in mid-latitudes and "ducts" leading from tropics. The essential features of the circulation of the Northern Hemisphere lower tropopause in winter and summer are indicated in generalized models. *Subject Headings:* **General circulation, Thermodynamics of the atmosphere, Atmospheric disturbances.**—*C.E.P.B.*

2.3–63 551.513.1

Van Mieghem, Jacques, **Comment on the global energy balance of the atmosphere.** Royal Meteorological Society, Centenary Proceedings 1950:173–175. 3 refs., 4 equations. **MH-BH**—From a mathematical discussion, author concludes that the meridional energy flow in the atmosphere is the resultant of an equatorial flow due to the mean meridional air flow and poleward flows of sensible and latent heat and flux of relative linear zonal momentum. The

difficulties of this result are discussed. *Subject Headings:* **General circulation, Thermodynamics of the atmosphere.**

2.3–64 551.513.1:551.558.2

White, Robert M., **A mechanism for the vertical transport of angular momentum in the atmosphere.** *Journal of Meteorology*, 7(5):349–350, Oct. **1950.** fig., table, 2 refs. **MH-BH**—Upper wind data computed from 8 *rawin* stations in the U. S. (east of Rocky Mountains) correlated with clear weather or precipitation as index of vertical upward or downward motions, shows significant (Student's *t* test) relation between weak zonal winds and precipitation, tending to confirm Starr's theory that there is upward transport of angular momentum in areas of weak zonal circulation and vice versa. Climatological (continental-maritime) influences were not considered, however. *Subject Headings:* **Transport of momentum, Vertical motion, Zonal circulation.**—*M.R.*

2.3–65 551.513.1:551.583.1

Yamamoto, T., **On the problems of heat transfer in the neighbourhood of Japan.** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(6):211–218, June **1950.** 3 figs., 4 tables. In Japanese, English summary p. 217–218. **DWB**—It is shown that owing to increase of atmospheric circulation by 16% the temperature difference (1918–47)–(1888–1914) has increased north of 35°N, by as much as 1.4°C. in 70°N, and decreased south of 35°N, the relation to latitude being linear. Relation of mean annual temperature to latitude in 1888–1947 is given by $31.6-52.7 \sin^2\phi$. The exchange (Austausch) coefficient is estimated at 0.57×10^8 and the heat transport across 40°N as .010 cal./cm.²/sec. *Subject Headings:* **Atmospheric circulation, Climatic variations, Japan.**—*C.E.P.B.*

2.3–66 551.513.3:551.509.318

*Tajima, S., **On the meridional oscillation of anticyclone of horse latitudes in Japan and its effect on the weather.** *Geophysical Magazine*, Tokyo, 22(2):109–130, Nov. **1950.** 24 figs., 10 tables, 8 refs. In English. **MH-BH**—Presents a number of correlation studies based on the hypothesis that a 9 year period in winter and summer temperatures is associated with meridional oscillation of the sub-tropical anticyclonic belt. This oscillation is complicated by the fact that part of the belt is over the continent and part over the ocean, so varying changes in solar intensity produce varying effects. A seeming 9-year period in typhoon frequency (1890–1947) is also involved. *Subject Headings:* **Periodicities, Anticyclones, Japan.**—*M.R.*

ATMOSPHERIC DISTURBANCES

2.3–67 551.515

§Bleeker, W., **The structure of weather systems.** Royal Meteorological Society, Centenary Proceedings **1950**:66–80. 9 figs., 19 refs. **MH-BH**—Author defines a "weather system" as a thermodynamic result of differential heating or cooling. He first discusses thermal lows and highs on a non-rotating earth, showing development of circulation, and then introduces effect of rotation. This is illustrated by tropical low pressure belt, seasonal lows over continents and oceans, quasi-stationary and moving "linear" weather systems and the moving front-jet system. The development and structure of cyclones of temperate latitudes is examined with examples. *Subject Heading:* **Atmospheric disturbances.**

2.3–68 551.515(7)

§Godson, W. L., **The structure of North American weather system.** Royal Meteorological Society, Centenary Proceedings **1950**:89–106. 7 figs., table, 27 refs. **MH-BH**—North American winter and summer air masses are described, the transformation from cold to warm or *vice versa* analyzed, and their mean temperatures tabulated. The main frontal systems are described with particular emphasis on the "three air mass" theory (after RODEWALD) and three-dimensional continuity of the main frontal surfaces. The chief frontal features are upper cold fronts, especially on the west coast; upper warm or quasi-stationary fronts involving simultaneous frontolysis and frontogenesis; cold domes and warm pockets. The structure and development of these are described by charts of Jan. 5, 1949. Finally, the possibilities

of complete three-dimensional frontal and air-mass analysis are emphasized. *Subject Headings:* **Air masses, Frontogenesis, North America.**

2.3–69 551.515.1:621.396.9

Johnson, F. H., **Trough of low pressure on radar. North Atlantic Ocean.** *Marine Observer*, 20(150):196, Oct. **1950.** 2 figs. **MH-BH**—When disturbance was 4 miles astern the radar screen showed an arc of reflection. *Subject Headings:* **Barometric depressions, Radar meteorology, North Atlantic.**

2.3–70 551.515.1:551.543:551.509.311

§Vederman, Joseph, **Changes in vertical mass distribution over rapidly deepening lows.** *American Meteorological Society, Bulletin*, 30(9):303–309, Nov. **1949.** 7 figs., 6 refs., 6 equations. **DWB**—As a result of an investigation of 25 rapidly deepening storms, it was found that the lower part of the storm becomes colder and denser as the storm deepens, while the upper part becomes thicker and warmer. This is contrary to earlier ideas about deepening being due to warm, light troposphere. *Subject Headings:* **Extratropical cyclones, Deepening.**—*M.R.*

2.3–71 551.515.11(261)(4)

§Sawyer, J. S., **An example of cyclogenesis in relation to Sutcliffe's theory of development.** Royal Meteorological Society, Centenary Proceedings **1950**:107–113. 4 figs., 4 refs., 3 equations. **MH-BH**—After summarizing equations by SUTCLIFFE (1947) and CHARNEY (1949) of relative vorticity, author gives charts of 1000 and 500 mb. surfaces and isopleths of thermal vorticity, thermal steering and SUTCLIFFE's relative divergence over North Atlantic and western Europe on selected dates. They show the close association between the maximums of these terms and the areas of cyclogenesis, and the increasing importance of the thermal steering term as the system develops. *Subject Headings:* **Cyclogenesis, North Atlantic, Europe.**

2.3–72 551.515.127(7)

§Riehl, Herbert, **Variations in the structure of high-level cyclones.** *American Meteorological Society, Bulletin*, 31(8):291–294, Oct. **1950.** 4 figs., 6 refs. **MH-BH**—From an analysis of 300 mb. charts and of cross sections from Miami to Arctic Bay, etc. during presence of unusually marked upper cyclones, it was noted that often these vortices contain a deep body of extremely cold air and a high tropopause, but that there is always a low tropopause somewhere on the cross section, often displaced by 20° latitude. Conclusion is that low tropopause is associated with jet stream which lies south of vortex center. *Subject Headings:* **Upper level cyclones, Tropopause, Cross sections, North America.**—*M.R.*

2.3–73 551.515.3(492)

Feteris, P. J., **Dutch tornadoes.** *Weather*, 5(12):432, Dec. **1950.** fig. **MH-BH**—Brief account of destructive tornadoes in Holland on Aug. 23, 1950, and sketch of tracks. *Subject Headings:* **Tornado tracks, Netherlands.**

2.3–74 551.515.3:551.576

Water-spout or tornado cloud? *Indian Journal of Meteorology and Geophysics*, 1(3):240–241, July **1950.** photo. **MH-BH**—A photograph and discussion of a tornado cloud observed near the Hooghly River on 10 July 1949. Weather conditions at the time of the occurrence are given. *Subject Headings:* **Tornado clouds, India.**—*I.L.D.*

2.3–75 551.515.3:551.513:551.541

Tepper, Morris, **On the origin of tornadoes.** *American Meteorological Society, Bulletin*, 31(9):311–314, Nov. **1950.** 3 figs., 6 refs. **MH-BH**—The hypothesis that the preferred region of tornado formation is found at the interaction zone of two intersecting pressure jumps is shown to conform to observations about the nature of tornadoes made by other investigators. This hypothesis is tested against ten tornado situations. Five verified the hypothesis very closely; in three verification was impossible because of inadequate data; in two the hypothesis was not applicable. The method of verification and two verified situations are presented. A mechanism for the formation of a pressure jump line that is not related to a cold front is

proposed, and it is regarded as associable with an increase in wind speeds below the warm sector inversion. The pattern of this mechanism is similar to the formation of a hydraulic jump by shooting water in a channel. Changes in meteorological practices are suggested in order to attain data on sharp pressure discontinuities. (*Same item* as E–130 in May 1950 *Meteorological Abstracts*) *Subject Headings:* **Tornado formation, Pressure jump, Atmospheric circulation, Thermodynamics of the atmosphere.**—*I.L.D.*

2.3–76 551.515.4

§Chalié, L. and Giteau, R., **Étude de la situation météorologique des 12 et 13 mai 1948 sur la Méditerranée occidentale et les régions voisines.** [Study of the meteorological situation in the western Mediterranean region on May 12 and 13, 1948.] *La Météorologie*, 4th Ser., No. 18:107–110, April–June **1950.** 10 figs. French, English and Spanish summaries p. 107. **DWB**—Synoptic charts and cross sections illustrate the principal characteristics of a deep cyclone which produced widespread violent storms in the western Mediterranean. Suggestions for forecasting such conditions are given. *Subject Headings:* **Synoptic studies, Thunderstorms, Western Mediterranean.**—*M.R.*

2.3–77 551.515.4

§Fujita, T., **Micro-analytical study of thunder-nose.** *Geophysical Magazine*, Tokyo, 22(2):71–88, Nov. **1950.** 21 figs., 4 refs., equations. In English. **MH-BH**—A remarkable thunderstorm on Aug. 24, 1947 is described and analyzed in great detail from a synoptic, aerological, dynamical and micrometeorological point of view. The cloud physics and electrical conditions are also considered in detail, with numerous charts and diagrams. *Subject Headings:* **Thunderstorms, Japan.**—*M.R.*

2.3–78 551.515.4

Mull, S. and Rao, Y. P., **Dynamics of thunderstorms, Pt. II.—Origin of downdrafts in a thunderstorm and the circulation in a full-fledged thunderstorm cell.** *Indian Journal of Meteorology and Geophysics*, 1(4):291–297, Oct. **1950.** 2 figs., table, 8 refs. **DWB**—Downdrafts are essential to development of thunderstorm and circulation comparison with laboratory experiments. A mechanism is discussed and illustrated whereby sudden cooling is produced in a cumulus congestus, thus initiating a downdraft which converts the cumulus into a cumulonimbus. Raindrops or hailstones are not essential for this cooling process, but water in a liquid and solid phase must coincide with level of supercooling so that much liquid water is present when sudden melting of ice crystals and congelation of supercooled water takes place. *Subject Headings:* **Thunderstorm dynamics, Cloud physics.**—*M.R.*

RADIATION AND TEMPERATURE

RADIATION

2.3–79 551.52:551.511

*†Albrecht, F., **Untersuchungen über den Wärmehaushalt der Erdatmosphäre und seine thermodynamische Bedeutung.** [Investigations of the heat economy of the earth's atmosphere and its thermodynamic importance.] *Germany, Deutscher Wetterdienst in der US-Zone, Berichte*, No. 17, **1950.** 70 p. 44 figs., 22 tables p. 56–70, 66 refs. **MH-BH**—This monograph constitutes an outstanding contribution to the knowledge of the role played by water vapor and radiation balance in the general circulation, cyclo- and anticyclogenesis, trade winds, rainfall, subsidence, tropopause height (and temperature), etc. The author has collected an enormous amount of aerological data since 1930, and during the winter of 1946–1947 he worked up a great many individual and mean soundings, charts and schematic diagrams showing the effects of radiative exchange on the above elements in various latitudes and regions of the earth. The effect of cloudiness and water vapor is treated analytically—that is, the actual exchange is calculated for various types and heights of clouds and these are presented schematically along with numerous correlation charts, nomograms and charts of the earth showing various aspects of the energy exchange in relation to pressure, wind, rainfall, cloudiness, etc., over oceans and

continents in all latitudes. For those who like tabular material better than charts and diagrams, the essence of the material is presented in 15 large pages of summary tables. In addition there is a good bibliography on the subject. *Subject Headings:* **Energy exchange, Thermodynamics of the atmosphere.**—*M.R.*

2.3–80 551.521:551.524.4:551.524.7

Robinson, G. D., **Two notes on temperature changes in the troposphere due to radiation.** Royal Meteorological Society, Centenary Proceedings 1950:26–29. 3 figs., 3 refs. **MH-BH**—1. "Radiative heat exchange near a short grass surface," gives an example of temperature difference between short grass and screen at Kew (up to 20°C.) and temperature and humidity structure up to 2 m. The radiative flux and temperature change were measured and computed. 2. "An example of radiative and convective heat changes in a cloudless air mass," computes radiative flux changes between surface and 500 mb. The resulting heat loss (about 1.3°C. in 24 hours) is approximately compensated by heat gain due to convection at the surface. *Subject Headings:* **Vertical temperature gradient, Upper air temperatures, Radiation.**

2.3–81 551.521

Visser, S. W., **De warmtebalans van de aarde.** [The heat balance of the earth.] *Hemel en Dampkring*, 48(9):141–145, Sept. 1950. 4 diagrs., ref. **DLC**—A general, but technically accurate, summary of present knowledge of the radiative factors affecting the earth's atmosphere and earth's surface under conditions of cloudy, partly cloudy and clear sky, and in the average; considering absorption, reflection, diffusion and transmission. The effect of vapor balance, as well as radiative balance on the hydrologic cycle, is discussed and illustrated by clever schematic diagrams. *Subject Headings:* **Radiation balance, Hydrologic cycle.**—*M.R.*

2.3–82 551.521.1(52)

*Kawabata, Y. and Fujito, M., **Distribution of total horizontal insolation in Japan and its neighbourhood.** *Geophysical Magazine*, Tokyo, 22(2):143–155, Nov. 1950. 7 figs., table, 3 refs. In English. **MH-BH**—By the end of 1944 at least 60 stations in Japan had been equipped with simple actinographs. Records from 50 of these stations for 1 to 15 years, although not consistent (due to changes in constants or deterioration of the equipment), have been summarized and analyzed statistically in many ways. Relation of insolation to cloud amount, to season and region, to vapor pressure and between land and ocean are presented in tables and charts, and discussed briefly. *Subject Headings:* **Insolation, Japan.**—*M.R.*

2.3–83 551.521.11(494)

†*Thams, J. Chr. and Ambrosetti, Fl., **Insolazione possibile nella regione del Lago Maggiore.** [Possible insolation in the region of Lake Maggiore.] *Schweizerische Meteorologische Zentralanstalt, Annalen*, (Vol. 1944):4–11, [1945]. 3 figs., 3 tables, 16 refs., append. In Italian, German and French summaries p. 4. (Reprint available) **MH-BH**—Measurements of actual number of hours of possible sunshine for 15 places on the two sides of Lake Maggiore (in the southern Alps) are presented and interpreted in respect to the climatological, agricultural and medical meteorological problems. The great difference between the north and south shores (due to topography) is clearly indicated. Average hours of possible sunshine vary from 8.5 at S. Abbondio to 10.7 at Magadino Airport. Astronomically possible = 12.2. *Subject Headings:* **Insolation, Topographic effects, Lake Maggiore, Switzerland.**—*M.R.*

2.3–84 551.521.3:551.521.61:551.574.1:551.591.1

Bricard, J., **Propagation of visible and infra-red radiations through fog.** Royal Meteorological Society, Centenary Proceedings 1950:36–42. 7 figs., 16 refs., 3 equations. **MH-BH**—A beam of wave length λ passing through N water drops of radius R is diffused in ratio $2N\pi R^2 f(R/\lambda)$. The function $f(R/\lambda)$ is plotted against $2\pi R/\lambda$ and shows 2 maxima at 6 and 15. Frequency curves of drop sizes in fog and cloud differ appreciably. Absorption of light of different wave lengths in artificial fog studied experimentally was almost constant in all parts of the spectrum (0.5–5μ) and agreed with that calculated from the theoretical equation of coefficient of apparent absorption. *Subject Headings:* **Radiation, Condensation nuclei, Visibility.**

2.3–85 551.521.3:551.524.7

Cowling, T. G., **The calculation of radiative temperature changes.** Royal Meteorological Society, Centenary Proceedings 1950:19–25. 7 refs., 10 equations. **MH-BH**—After pointing out that uncertainties about some of the factors are not of great importance, author lays down simplifying assumptions for calculating radiative flux and heating, and sets out the mathematical expressions and their consequences. He transforms these into forms suitable for numerical or graphical calculation and for evaluating the temperature of the stratosphere in radiative equilibrium. *Subject Headings:* **Upper air temperatures, Radiation calculations.**

2.3–86 551.521.32:551.510.534

Adel, Arthur, **The emission spectra of the earth's surface, the troposphere and the lower stratosphere.** Royal Meteorological Society, Centenary Proceedings 1950:5–8. 2 figs., 2 tables, 2 refs., equation. **MH-BH**—From simultaneous observations of the infrared emission spectra of the surface, troposphere and lower stratosphere at Flagstaff, Ariz., author calculates effective radiation temperature of ozone layer as −40°C. and of NO_2 as +5°C. *Subject Headings:* **Infrared radiation, Ozonosphere temperatures.**

2.3–87 551.521.7

Pawsey, J. L. and Yabsley, D. E., **Solar radio-frequency radiation of thermal origin.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 2(2):198–213, June 1948. 10 figs., 4 tables, 18 refs. **MH-BH**—Observations of solar radiation from 1 cm. to 4 m. wave length lead to the conclusion that such radiations are a result of thermal radiation from ionized gases on the sun and that the corona of the sun has a kinetic temperature of a million degrees. *Subject Headings:* **Solar radiation, Radio-frequency radiation.**—*From author's abstract.*

TEMPERATURE

2.3–88 551.524.3:551.521.61:551.501.45

Brooks, Douglas Lee, **A tabular method for the computation of temperature change by infrared radiation in the free atmosphere.** *Journal of Meteorology*, 7(5):313–321, Oct. 1950. 4 figs., 6 tables, 9 refs., 17 equations. **MH-BH**—Detailed tables and diagrams are presented for calculation of the rate of radiational temperature change in the free atmosphere on an empirical basis (F. A. Brooks' and Robinson's measurements); the emissivity curve for water vapor (disregarding CO_2) is developed and its application discussed and illustrated. Comparisons are made with similar calculations from sounding, using Elsasser charts or Bruinenberg's tables. *Subject Headings:* **Temperature changes, Radiation calculations, Computation tables.**—*M.R.*

2.3–89 551.524.31 551.524.36

Calef, Wesley, **Interdiurnal variability of temperature extremes in the United States.** *American Meteorological Society, Bulletin*, 31(8):300–302, Oct. 1950. 3 figs., 4 refs. **MH-BH**—Charts of the United States show isolines of interdiurnal variability in mean (Greely) and minimum January temperatures and in maximum July temperatures (compiled by author). Greatest variability is in Northern Plains (8–10°F.). Displacement of center of minimum temperature variability toward west (Montana) compared with center in average map, indicates that in the East the high variability is probably due more to the variable maxima than variability in minima. Not much difference between values from 5 year and 10 year records. *Subject Headings:* **Interdiurnal temperature variations, United States.**—*M.R.*

2.3–90 551.524.31:551.586:612

Henneberger, Charlotte, **Tagesgang und Komponenten der Abkühlungsgrösse.** [Daily variation and components of cooling power.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):86–119, 1950. 7 figs., 5 tables, 20 refs., 8 equations. English and French summaries p. 86, German p. 117–118. **MH-BH**—Hourly observations of cooling power were made at Davos 1941–46 with a frigorimeter and registering Watt-hour counter, and were compared with meteorological elements. Cooling power in m.cal./cm²/sec is related to excess θ of frigorimeter over air temperature by $(0.145+0.117v)\,\theta$ where v is wind velocity

in m./sec. Rain and snow increase this by about 4 m.cal. Diurnal variation depends on diurnal variation of wind, temperature and radiation; cooling is least before noon and greatest in evening. Range is 4–6 m.cal. and varies little through year. Diurnal variation is tabulated separately by months for radiation and overcast days and for "days of illness" (Krankentage). *Subject Headings:* **Cooling power, Temperature variations, Bioclimatology, Davos, Switzerland.** —*C.E.P.B.*

2.3–91 551.524.34:551.583.14

Willett, H. C., **Temperature trends of the past century.** Royal Meteorological Society, Centenary Proceedings **1950**:195–206. 9 figs., 5 refs. **MH-BH**—Winter and annual means for 183 stations in World Weather Records analyzed for temperature trend by 5- and 20-year periods. Results shown in graphs and world charts indicate a progressive rise since 1885 (year, 1°F., winter 2.2°F.) but a fall in Antarctic. The geographical pattern shows that the primary cause is in the intensity and position of winter polar anticyclones in Europe and North America. *Subject Headings:* **Temperature trends, Climatic changes.**

2.3–92 551.524.37

Cold wave and extensive dust haze of February, 1950. *Indian Journal of Meteorology and Geophysics*, 1(3):241–244, July **1950.** fig., table. **MH-BH**—The synoptic conditions associated with development of the cold wave of February 1950 and the accompanying dust haze are described. Maps showing isotherms of minimum temperature and areas of prevailing dust haze and a table giving lowest temperatures recorded at the principal cities are given. *Subject Headings:* **Cold waves, Dust haze, India.**—*I.L.D.*

2.3–93 551.524.7

Cunningham, Robert M., **An observation of large temperature fluctuations in the free atmosphere,** *Journal of Meteorology*, 7(5):347–349, Oct. **1950.** 3 figs., 4 refs. **MH-BH**—On Dec. 5, 1949 a M.I.T. Weather Research plane encountered over Connecticut a layer 500 ft. thick (at about 8,000 ft.) in which the temperature fluctuated about 8°F. four times during a period of 45 seconds. Schematic cross section shows probable waves on an inversion surface and flight path of plane. Lapse rate above and below inversion was nearly adiabatic as shown by sounding at Hartford, Conn. *Subject Headings:* **Upper air temperatures, Airplane observations, Temperature fluctuations.**—*M.R.*

2.3–94 551.524.7:551.588.2

Deguillaume, M., **Décroissance de la température de l'air sec en altitude dans la région au vent d'une chaîne de montagnes.** [Decrease in temperature of dry air with altitude in regions on the windward side of a mountain range.] *La Météorologie*, 4th Ser., No. 18:117–119, April–June **1950.** fig., 4 equations. French, English and Spanish summaries p. 117. **DWB**—A simple theory, ignoring turbulence, indicates that when wind blows over a barrier the decrease in pressure with height is greater than it would be in a calm atmosphere. Also, the decrease in temperature along the current of air is greater than the dry adiabatic for still air. Theory may not agree with fact. *Subject Headings:* **Mountain meteorology, Upper air temperatures, Vertical temperature gradient, Orographic effects.**—*M.R.*

2.3–95 551.525.2

Lehmann, K., **Abhandlung über Bodentemperaturen.** [Treatise on soil temperatures.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:79–91, **1949.** 7 figs., 11 refs. **DWB**—Six resistance thermometers were installed at 5, 10, 25, 50, 75 and 100 cm. depth at Collm Observatory and records made on a six color recorder. The march of soil temperature at these depths is discussed and illustrated by various types of graphs for periods of warm sunny weather (May 1947), winter weather (under a snow cover in Jan. 1947), for onset of cold weather (Dec. 1946), transition period (March 1947) and finally, for a rainy day in April. Sharp drops in soil temperature at shallow depth are shown after cold waves or rain, slow drops during radiation cooling and rapid rise due to insolation. Little change occurs at 100 cm. depth. *Subject Headings:* **Soil temperatures, Collm Observatory, Leipzig, Germany.** —*M.R.*

2.3–96 551.526.6

Dietrich, Günter, **Die anomale Jahresschwankung des Wärmeinhalts im Englischen Kanal, ihre Ursachen und Auswirkungen.** [The anomalous annual variation of heat content in the English Channel, its causes and effects.] *Deutsche Hydrographische Zeitschrift*, 3(3–4):184–201, **1950.** 13 figs., 8 tables, 37 refs. German and English summaries p. 184. **DWB**—Heat content is defined as amount of heat in a column of water 1 sq. meter in section, compared with that in a similar column at 10°C. Annual variation is difference between hottest time of summer and coldest of winter. This is known for various European seas and is mostly $3–5 \times 10^5$ kcal. The distribution of heat content in the English Channel is analyzed in detail and the annual variation is charted. It exceeds 4×10^5 kcal over a large area and 10×10^5 in a strip NW of Cherbourg. The greatest possible range calculated from radiation balance and evaporation is well under 4×10^5. The causes of the excess are set out in a diagram (also in English); the large annual range is attributed to the bottom topography favoring very strong tidal currents, destruction of thermal stratification and consequent decrease of evaporation (with fog maximum in early summer), and the inflow of warm surface water reaching a maximum in summer. *Subject Headings:* **Sea temperatures, English Channel.**—*C.E.P.B.*

2.3–97 551.526.6:551.513

Neumann, Gerhard, **Über Temperaturanomalien an der Meeresoberfläche und ihre Beziehungen zur atmosphärischen Zirkulation.** [On temperature anomalies at the sea surface and their relation to atmospheric circulation.] *Deutsche Hydrographische Zeitschrift*, 3(3–4):206–213, **1950.** 11 figs. (fold. in pocket), 2 tables, 11 refs. German and English summaries p. 206. **DWB**—Periodic and aperiodic oscillations of temperature in the North Atlantic are studied and found to be generated locally; they are not due to wandering anomalies, but appear almost simultaneously over wide regions. There is a temperature "see-saw" between northwestern and southeastern or eastern areas. The anomalies are due to dynamic convergence and divergence connected with oscillations of the oceanic circulation caused by variations of the atmospheric circulation. *Subject Headings:* **Sea temperatures, Atmospheric circulation, Atlantic Ocean.**—*C.E.P.B.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

2.3–98 551.54:551.501.42

Thompson, Jack C., **Tables for computing the height of standard pressure surfaces from aircraft reports.** *American Meteorological Society, Bulletin*, 30(8):286–287, Oct. **1949.** 3 tables, ref., 4 equations. **DWB**—Tables based on Bellamy's equations, but assuming a standard lapse rate from sea level to the height of the plane, are presented for heights of 850, 700 and 500 mb. surfaces over a wide temperature range. *Subject Headings:* **Computation tables, Baric topography, Altimeter corrections.**—*M.R.*

2.3–99 551.541

Freeman, John C., Jr., **Map analysis in the vicinity of a pressure jump.** *American Meteorological Society, Bulletin*, 31(9):324–325, Nov. **1950.** 3 figs., 5 refs. **MH-BH**—The author suggests that the abruptness of pressure changes which mark the "pressure jump" can be represented on the daily weather map by assuming that the pressure jump is a line of discontinuity in pressure. An example of this analysis applied to an actual synoptic situation is given. *Subject Headings:* **Pressure jump, Graphical presentation.**—*I.L.D.*

2.3–100 551.543:551.513.1

Gião, António, **Analysis of the pressure variations at sea-level.** *Geofisica Pura e Applicata*, 16(3–4):141–158, April–June **1950.** 12 refs., 59 equations. English and French summaries p. 140. **MH-BH**—The tendency equation at sea level is derived from the equation of continuity, and is shown to be insufficient for forecasting pressure variations. Hence, the equation of motion is combined with the tendency equation, giving a partial differential equation for pressure at sea level, which can be reduced to a partial differential equation for the height-integral of pressure and also written as a linear integro-differential equation. The

latter can be expanded for the case of a geoid surface. *Subject Heading:* **Pressure variation analysis.**—*From author's abstract.*

2.3–101 551.543:551.588.2

Schaffer, W., **Pressure gradient associated with steeply inclined air-flow.** *American Meteorological Society, Bulletin*, 31(8):305–306, Oct. **1950.** fig., equations. **MH-BH**—Theoretical study of horizontal pressure gradient associated with flow of air over an obstacle. (Summary of paper by author in the *Royal Society of South Africa, Transactions*, 32, Pt. II, 1949.) *Subject Headings:* **Pressure gradients, Orographic effects.**

2.3–102 551.543:551.510.534

Wexler, Harry, **Possible effects of ozonosphere heating on sea-level pressure.** *Journal of Meteorology*, 7(6):370–381, Dec. **1950.** 8 figs., table, 24 refs., 18 equations. **MH-BH**—The author discusses the hypothesis that large scale weather anomalies in the Northern Hemisphere are of extraterrestrial origin and are the result of rapid heating or cooling of the ozonosphere by variable ultraviolet radiation of the sun and consequent variations in the sea-level barometric pressure. In order to determine whether transfers of mass accompany the readjustment processes of thermally produced pressure gradients two mathematical models are postulated, namely: 1) a single layer homogeneous atmosphere on a plane rotating earth and 2) a two-layer atmosphere. Pressure changes resulting from assumed amounts of heating are computed for both models; and in the case of the second more realistic model the effect of sudden heating of the ozonosphere produces an insignificant change in sea level pressure. An analysis of a forty year series of daily Northern Hemisphere sea-level maps was made in order to determine whether periods of sunspot maxima or minima influence the meridional profile. There is evidence that there is an excess of pressure at higher latitudes and a deficit at lower latitudes during sunspot maxima, but the differences in the pressure profiles are small and random. *Subject Headings:* **Pressure variations, Solar influences, Ozonosphere.**—*I.L.D.*

2.3–103 551.543.1:551.553.1(932)

*Suraud, P., **La pression et le vent au sol à Nouméa.** [Surface pressure and wind at Nouméa.] *La Météorologie*, 4th Ser., No. 18:75–84, April–June **1950.** tables, equations. French, English and Spanish summaries p. 75. **DWB**—The diurnal variation in pressure at Nouméa, New Caledonia, for the years 1935–1941, is calculated by means of Fourier Series. Theoretical basis for calculating noon wind frequencies (from each direction), from observed values at 0700, is elaborated. Results checked against observations at 1200. For good results, land-sea breeze effects must be considered. *Subject Headings:* **Diurnal pressure variations, Diurnal wind variations, Nouméa, New Caledonia.**—*M.R.*

2.3–104 551.543.2

Flohn, Hermann, **Über die Existenz höherer Oberschwingungen der Jahresperiode des Luftdrucks.** [About the existence of upper level oscillations of the annual period of air pressure.] *Leipzig, Universität, Geophysikalisches Institut, Veröffentlichungen*, Ser. 2, 15:14–33, **1949.** 2 figs., 2 tables, 45 refs. **DWB**—Two series of observations of pressure at Frankfurt, totaling 83 years, were analyzed harmonically and significant periods of 73, 30–33 and 16 days were found. These are combined with the yearly, semi- and one-third yearly periods to give a theoretical curve for yearly pressure that corresponds roughly with the actual. Explanation on the basis of singularities in the upper atmosphere is given. *Subject Headings:* **Pressure waves, Harmonic analysis, Singularities, Frankfurt a. M., Germany.**—*M.R.*

TURBULENCE

2.3–105 551.551:523.2:523.4

Huang, Su-shu, **On turbulence of the atmospheres of the sun and the stars.** *Astrophysical Journal*, 112(3):418–423, Nov. **1950.** fig., 13 refs., 12 equations. **MH-BH** –Effect of large or small eddies on broadening absorption lines is discussed. Size of fastest moving eddies most important. Variation from star to star described and turbulent spectrum of sun (based on observed data) discussed and illustrated. *Subject Headings:* **Turbulence spectrum, Stellar atmospheres, Solar atmosphere.**—*M.R.*

2.3–106 551.551:551.593.12 551.594.7

Megaw, E. C. S., **Scattering of electromagnetic waves by atmospheric turbulence.** *Nature, London*, 166(4235):1100–1104, Dec. 30, **1950.** 2 figs., 2 tables, 18 refs. **DLC**—Author first discusses spectra of stellar scintillation due to variable atmospheric refraction. Angular fluctuations near the zenith show that density variation increases roughly as $t^{\frac{1}{3}}$ for periods of 1–50 seconds as required by Kolmogorov's theory (1941); above this it varies as $t^{-\frac{1}{4}}$. He assumes that all the observations can be accounted for by an average spectrum of turbulence which is a permanent characteristic of the atmosphere. He then considers the scattering of short radio waves by atmospheric turbulence on the basis of observed scattering of a 10 cm. wave over 0–300 sea miles. This agrees with the theory of Booker and Gordon and with that derived from the scintillation spectrum. *Subject Headings:* **Turbulence spectrum, Scintillation, Radio transmission.**

2.3–107 551.551.(54)

Ramakrishnan, K. P., **Wave patterns on some anemograms of Madras.** *Indian Journal of Meteorology and Geophysics*, 1(4):312–314, Oct. **1950.** 3 figs., 3 refs. **DWB**—Some very peculiar anemograms are reproduced. Regular waves of 90° amplitude in direction and 6 m.p.h. appear with an amplitude of about 15 minutes. Many similar cases are cited and causes discussed. *Subject Headings:* **Turbulence, Anemograms, Madras, India.**—*M.R.*

2.3–108 551.551:

Wrubel, Marshal H., **Turbulence and the curve of growth.** *Astrophysical Journal*, 112(3):424–433, Nov. **1950.** 3 figs., 3 tables, 8 refs., 36 equations. **MH-BH**—Although eddies of all sizes affect the absorption line contour, small eddies have greater effect upon the total absorption and the curve of growth. A weighting function $s(k)$ is derived for various circumstances of line formation. It is shown that all eddies of diameter smaller than two and a half times the scale height of the atmosphere appear in the curve of growth. Therefore, to explain the large differences observed in supergiant spectra between line contours and curves of growth, this theory requires a spectrum of turbulence with considerable energy in very long wave lengths. Such a spectrum may possibly be due to the effect which turbulence at deep layers may have upon the higher region of the atmosphere in which the lines are formed. *Subject Headings:* **Turbulence spectrum, Turbidity.**—*Author's abstract.*

WIND

2.3–109 551.552(266)

Freeman, John C., Jr., **The wind field of the Equatorial East Pacific as a Prandtl-Meyer expansion.** *American Meteorological Society, Bulletin*, 31(8):303–304, Oct. **1950.** 2 figs., 4 refs. **MH-BH**—Wind field off west coast of South America was computed from a theoretical model with a bend similar to that in South America near the equator, using a Prandtl-Meyer expansion and assuming a constant inversion of .65 km and $\Delta T = 1°C$. Results were similar to actual October resultant winds over 5° squares as shown in "Climatic Charts of the Oceans," U. S. Weather Bureau, 1938. *Subject Headings:* **Wind field, Prandtl-Meyer expansion, Topographic effects, Tropical Pacific, South America.**—*M.R.*

2.3–110 551.556:551.524:551.526.6

Bintig, Paul, **Der Einfluss des Windes auf die Wassertemperaturen des Ozeans und ihr Zusammenwirken mit der Lufttemperatur. 1. Mitteilung.** [The influence of the wind on the water temperature of the ocean and its connection with the air temperature.] *Annalen der Meteorologie*, 3(7–8):193–201, **1950.** 5 figs., 2 tables, 10 refs. German and English summaries p. 193. **DWB**—Data used—137,000 ships' observations in West Biscay and East Atlantic (47½–50°), all seasons. In Biscay, air and water temperatures fall steadily with increasing wind force; for force 12, 2–3°C. lower than for calm. In East Atlantic air temperature slightly higher with force 1–4 than with calm, then lower; sea temperature falls steadily. Effect greatest in spring and summer, and with winds from North Quadrant. The effect is analyzed into advective (especially in air) and dynamic (cooling by effect on stratification of upper layers). *Subject Headings:* **Wind effects, Air temperature, Sea temperatures, Bay of Biscay, Atlantic Ocean.**—*C.E.P.B.*

2.3–111 551.555.9:551.588.2

Steinhauser, F., **Über die Windverstärkung an Gebirgszügen. Ein Beitrag zur Frage der Beeinflussung der Luftströmungen durch Gebirge.** [On the increase of wind over mountain chains. A contribution to the question of the modification of air currents by mountains.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):39–64, **1950.** 9 figs., 5 tables, 2 refs. German, English and French summaries p. 39–40. **MH-BH**—The narrow mountain ridge of the Little Carpathians extending NE–SW about 400 m. above surrounding country between Hungary and lower Austria has a large effect on the winds blowing across it, as shown by observations at Weinern and Malacky. Winds blowing from the mountains are greatly strengthened, especially on the NW side. This lee-side effect is limited to a narrow belt in which the light general wind becomes stormy and turbulent, with a fall of pressure by 3.5–5 mb. Excellent reproductions of pressure-tube anemograms. NW storms bring a fall, SE storms often a rise, of temperature. Other examples are mentioned. *Subject Headings:* **Winds, Orographic effects, Hungary, Austria.**—*C.E.P.B.*

2.3–112 551.556:551.46

Glaister, R. M., **Wind and sea at Lagg, Isle of Arran.** *Weather*, 5(12):429–431, Dec. **1950.** 2 figs. **DWB**—Daily observations of wind direction and speed and wave height, Aug. 22–Sept. 3, 1948. These are combined into a neat circular diagram, and causes of variations briefly discussed. *Subject Headings:* **Wind effects, Wave heights, Scotland.**

2.3–113 551.556.1

Aniol, R., **Schadenfreie Gebiete bei einem orkanartigen Sturm.** [Undamaged area in a hurricane-like storm.] *Meteorologische Rundschau*, 3(9–10):224, Sept.–Oct. **1950.** fig. **DWB, MH-BH**—In a destructive storm in Europe at end of Feb. 1949 a stretch of the U. S. Zone of Germany remained untouched. *Subject Headings:* **Wind damage, Germany.**—*C.E.P.B.*

2.3–114 551.556.4

Johnson, C. G., **The study of wind-borne insect populations in relation to terrestrial ecology, flight periodicity and the estimation of aerial populations.** *Science Progress*, 39(153): 41–62, Jan. **1951.** 4 figs., plate, 4 tables. **DLC**—Mainly a discussion of causes, other than weather, of variations in the number of insects caught in the upper air. Diurnal flight periodicity is especially important, but diurnal variation of convection also comes in. Catches at Cardington quoted at 500–2000 ft., with wind speeds. Population is defined in terms of density per unit volume and its calculation from catch and wind speed discussed. *Subject Headings:* **Wind effects, Insect migration, Aerobiology.**

2.3–115 551.557:551.513

Goldie, A. H. R., **The average planetary circulation in vertical meridian planes.** Royal Meteorological Society, Centenary Proceedings **1950**:175–180. 2 figs. **MH-BH**—The mean wind circulation up to 45 km. is represented in terms of resultant E–W motion, and the vertical motion inferred from differences of density. In each hemisphere there are 2, or (doubtfully) 3, circulations in opposite senses one over the other; this is explained by unequal heating of two atmospheric columns up to 250–370 mb. The lowest circulation is primary, the higher ones secondary. *Subject Headings:* **Planetary circulation, Upper air winds.**

AQUEOUS VAPOR AND HYDROMETEORS

WATER VAPOR AND CLOUDS

2.3–116 551.573:551.577.11

Dady, G., **L'évaporation des goutelettes d'eau.** [Evaporation of water droplets.] *Journal Scientifique de la Météorologie*, 2(8):108–120, Oct.–Dec. **1950.** 7 figs., 3 tables, 4 refs., 26 equations. French, English and Spanish summaries p. 108. **MH-BH**—The theory of rate of evaporation of freely falling drops of water is presented in detail. A graphical and tabular comparison of the theoretical rates as calculated from formulas of Houghton, Boussinesq and Frenkel is given and the conclusion made that Houghton's theory best fits the experimental

data for all drop sizes and the Boussinesq theory holds for drops $<40\mu$ diameter. Apparatus described and illustrated. Effect of turbulence fully considered in theory. *Subject Headings:* **Evaporation of raindrops, Turbulence.**—*M.R.*

2.3–117 551.573:551.576.11

Tsuji, M., **On the rate of evaporation of water drops.** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(4):119–121, April 1950. fig., 9 equations. In Japanese, English summary p. 121. **DWB**—A complex semi-empirical formula is derived involving diffusion constant, saturation and existing vapor pressures, drop temperature, kinematic viscosity and various constants. *Subject Headings:* **Evaporation, Cloud structure.**—*C.E.P.B.*

2.3–118 551.573(485):551.579

*Bergsten, Folke, **Contribution to study of evaporation in Sweden.** *Sweden, Sveriges Meteorologiska och Hydrologiska Institut, Meddelanden, Ser. D*, No. 3, 1950. 57 p. 23 figs., 3 tables, 10 refs., 3 equations, append. (incl. 10 tables). In English. **MH-BH**—Earlier works by Wallén and Melin on evaporation in Sweden are reviewed and the basic principles discussed. Effect of summer temperature on evaporation and runoff studied in general and for many individual basins. Records of temperature at Stockholm since 1756 are smoothed and plotted to show recent trends in proper perspective. It was concluded that hot dry summers show little difference from cool wet ones with respect to amount of evaporation. Detailed studies on precipitation, runoff, evaporation and temperature are based on data from 1920–1945. *Subject Headings:* **Evaporation, Hydrologic cycle, Sweden.**—*M.R.*

2.3–119 551.574

Imai, I., **On the capture of fog particles by a circular cylinder.** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(5):149–156, May 1950. 5 figs., 3 tables. In Japanese, English summary p. 156. **DWB**—The proportion of fog particles caught on a circular cylinder, and the distribution of the particles are calculated and the results applied to the problem of icing on electric cables. *Subject Headings:* **Condensation, Icing of cables.**—*C.E.P.B.*

2.3–120 551.574.1

Dessens, H., **Some remarks on the study of the microphysics of natural clouds.** Royal Meteorological Society, Centenary Proceedings 1950:59–60. 3 refs. **MH-BH**—Describes microcinematograph technique for measuring small droplets and studying freezing. *Subject Headings:* **Condensation nuclei, Freezing nuclei.**

2.3–121 551.574.1

Dobson, G. M. B., **Centenary symposium on physics of cloud and precipitation. Introductory address.** Royal Meteorological Society, Centenary Proceedings 1950:34–36. 5 refs. **MH-BH**—Summary of recent work on direct deposition of ice on nuclei in supersaturated air, and chain reaction by splintering of ice. *Subject Headings:* **Condensation nuclei, Cloud seeding, Cloud physics.**

2.3–122 551.574.1:536.42

Lafargue, C., **On the freezing of droplets of water and of aqueous solutions.** Royal Meteorological Society, Centenary Proceedings 1950:61–63. **MH-BH**—Describes technique for microscopical examination of freezing of small drops ($1–10\mu$). Freezing occurred about $-41°$C. in air and other media, and is attributed to a molecular property of water unaffected by surface tension. *Subject Headings:* **Condensation nuclei, Freezing nuclei.**

2.3–123 551.574.1

Ohta, S., **On the vertical distribution of condensation nuclei.** *Meteorological Society of Japan, Journal*, 2nd Ser., 28(6):188–200, June 1950. 3 figs., 9 tables. In Japanese, English summary p. 200. **DWB**—Observations of Aitken nuclei were made at various heights on Mt. Fuji. Diurnal variation showed a single max. in afternoon and min. midnight to early morning. Number of nuclei decreased exponentially with height, most rapidly in winter, with

discontinuities at 1000 and 2000 m. There were many spontaneous condensation nuclei in summer. The origin, movements and equilibrium of nuclei are discussed. *Subject Headings:* **Condensation nuclei count, Mt. Fuji.**—*C.E.P.B.*

2.3–124 551.574.1

Ohta S., **Investigations on condensation nuclei.** *American Meteorological Society, Bulletin*, 30(8):295–296, Oct. **1949.** 2 figs. **DWB**—The author here summarizes 3 of his earlier papers on: 1) A simple improved nucleus counter for routine work (Aitken type); 2) "Wall-effect" of the above counter; 3) Reports on vertical distribution of condensation nuclei along the slope of Mount Fuji. *Subject Headings:* **Condensation nuclei, Mt. Fuji.**—*C.E.P.B.*

2.3–125 551.574.1:551.578.41

Mason, B. J., **The formation of ice crystals and snowflakes.** Royal Meteorological Society, Centenary Proceedings **1950**:51–58. 2 figs., table, 13 refs., 2 equations. **MH-BH**—The growth of ice crystals is examined theoretically in relation to environment. The commonest form, the hexagonal prism, results from preferential growth along the principal axis at low temperatures (−40°C.). At higher temperatures (10°C.) thin hexagonal plates are formed. Dendritic forms are due to rapid growth at the corners at the expense of the sides, owing to shortage of vapor and to diffusion over a falling crystal. The formation of snowflakes by coagulation is briefly mentioned. *Subject Headings:* **Ice crystal formation, Snowflake formation.**

2.3–126 551.574.42

†*Dorsch, Robert G. and Hacker, Paul T., **Photomicrographic investigation of spontaneous freezing temperatures of supercooled water droplets.** *U. S. N.A.C.A., Technical Note* 2142, July **1950.** 57 p. 12 figs., 2 tables, 11 refs. **DLC**—Data for over 5000 droplets ranging from 9 to 1000μ in diameter were obtained by means of an apparatus which is described and illustrated. Many photographs of drops just after freezing are presented. Curves show frequency distribution of spontaneous freezing for various sizes of drops at different temperatures, indicating that for each drop size there is a marked peak at a certain temperature, but the temperature of spontaneous freezing decreases with decreasing drop size and the effect is most marked below 60μ. No drops froze at a higher temperature than 20°F. and all melted at 32°F. The same drop froze at the same temperature (on repeated freezing). *Subject Heading:* **Freezing nuclei.**—*M.R.*

2.3–127 551.576:551.506.7

*Ishimaru, Y., **Cloud and upper air current observation during the Second International Polar Year (July 1932 to August 1933) at Haneda weather station in Tokyo Air Port.** *Geophysical Magazine*, Tokyo, 22(2):157–175, Nov. **1950.** 2 figs., 21 tables, 14 equations. **MH-BH**—Photographic two-theodolite observations of clouds were made at Tokyo Airport during the Second International Polar Year. Methods of observation and calculation are described in detail and results are tabulated and discussed according to cloud type, direction and speed of movement, thickness, and elevation of base of cloud. A table shows monthly and altitude frequency of the 236 double theodolite observations (26 reached 3.6 km.). The highest cloud measured was at 14.8 km. (ci in summer). Mean horizontal and vertical components for every 100 m. level are calculated for each month of the year and presented in tables. *Subject Headings:* **Cloud data, Upper air data, International Polar Year, Tokyo, Japan.**—*M.R.*

2.3–128 551.576:551.574.1:551.509.67

Schaefer, Vincent J., **Experimental meteorology.** *Zeitschrift für angewandte Mathematik und Physik*, 1(3):153–184, May 15, **1950.** 13 figs., 2 tables. **DLC.** Continued and finished, *ibid.*, 1(4):217–236, July 15, 1950. 25 figs., 28 refs. In English. **DLC**—Paper read at conference at Lake Success, Aug. 22, 1949 (*see item* C–180, *Meteorological Abstracts*, 1(3), March 1950). Published article contains many beautiful photographs of clouds which have been seeded, showing dissipation or precipitation artificially induced. Also schematic diagrams and stroboscopic photographs of water drops, etc. *Subject Headings:* **Cloud seeding, Cloud physics, Experimental meteorology.**—*M.R.*

2.3–129 551.576.11:551.571.7

Tsuji, M., **On the saturated vapour pressure over small drops of aqueous solution.** *Geophysical Magazine,* Tokyo, 22(1):15–20, Oct. **1950.** 2 figs., 7 refs., 9 equations. In English. **MH-BH**—Saturated vapor pressure over water increases with curvature of the surface and decreases with salinity or electric charge in the drop. The relation between radius of drop and vapor pressure over the drop is calculated and shown graphically. Relation of relative humidity to amount of NaCl in solution shown by a series of curves for various drop sizes. *Subject Headings:* **Condensation nuclei, Saturation over drops, Cloud physics.**—*M.R.*

2.3–130 551.576.11

Tsuji, M., **On the rate of evaporation and condensation of falling drops.** *Geophysical Magazine,* Tokyo, 22(1):11–14, Oct. **1950.** fig., 5 refs., 11 equations. In English. **MH-BH**—A formula is derived for the rate of evaporation of a drop at rest and then for a drop falling through the air (based on an extension of Frössling's (1938) semi-empirical formula, using Schmidt's formula for calculating the velocity of the falling drop). Values of $\frac{da/dt}{C_\infty - C_s}$ for various drop sizes are plotted to show the nature of the variations. *Subject Headings:* **Cloud formation, Evaporation of rain drops.**—*M.R.*

2.3–131 551.576.11

Tsuji, M., **On the growth of cloud particles and the degree of supersaturation in convective clouds.** *Meteorological Society of Japan, Journal,* 2nd Ser., 28(4):122–130, April **1950.** 3 figs., 2 tables, 6 equations. In Japanese, English summary p. 128–130. **DWB**—In this mathematical paper author calculates supersaturation and temperature of air and rate of growth of cloud particles in upward currents in convective clouds assuming large nuclei and condensation occurring at 100% R.H. These are given in complex formulas. Supersaturation is usually less than 1% but may reach 3% with upward velocity 10 m./sec. and small nuclei. *Subject Headings:* **Cloud structure, Supersaturation.**—*C.E.P.B.*

PRECIPITATION

2.3–132 551.578.1

Imai, I., **On the velocity of falling raindrops.** *Meteorological Society of Japan, Journal,* 2nd Ser., 28(4):113–118, April **1950.** 3 figs., table. In Japanese, English summary p. 118. **DWB**—Translation of paper in English in *Geophysical Magazine,* Tokyo, 21(3):244–249, March 1950. (*Same item* as 10–132 in Oct. 1950, *Meteorological Abstracts.*) *Subject Heading:* **Raindrop velocity.**

2.3–133 551.578.11

Shinkai, K., **On the time variation of the amount of nitrogen compounds in thundershower and their causes of formation.** *Meteorological Society of Japan, Journal,* 2nd Ser., 28(5):177–180, May **1950.** 3 figs., 5 tables. In Japanese, English summary p. 180. **DWB**—Author measured NO_2, NO_3 and NH_3 in rain. The first two increase rapidly after violent thunder and are regarded as products of the discharge. Ammonia increases less rapidly and soon becomes constant, decreasing again to almost zero in 3 hours. Ammonia is attributed to human activity. *Subject Headings:* **Rain composition, Nitrogen compounds.**—*C.E.P.B.*

2.3–134 551.578.4:551.521

Gordon, A. R., Jr. and Woodworth, W. C., **Some inter-relationships of snow and ice conditions and weather in the Arctic.** *American Meteorological Society, Bulletin,* 31(8):271–278, Oct. **1950.** 8 figs., 10 refs. **MH-BH**—A review of studies made in various sectors of the Arctic, notably by the Norwegians (Sverdrup, Malmgren, Mosby and others) and the Russians. Effect of ice and snow on the radiative balance at the surface and in the lower atmosphere, effect of cloud cover and wind on snow and ice conditions and effect of snow cover on ice discussed. Status of forecasting sea ice reviewed, need for concerted program stressed. *Subject Headings:* **Snow cover, Topographic effects, Radiation balance.**—*M.R.*

2.3–135 551.578.4(436)

Steinhäusser, H., **Zur Bestimmung des Schneeanteils am Gesamtniederschlag.** [On the determination of the fraction of snow in the total precipitation.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):129–133, **1950.** 2 figs., table, 5 refs. German, English and French summaries p. 129. **MH-BH**—Monthly and annual means of amounts of precipitation (as water) corresponding with 1 cm. fresh snow are calculated for East Alps. They vary from about 1 mm. in Jan. to over 20 in May and Sept. Annual mean varies from 18 mm. near sea level to 8 mm. at 1300 m., then increases again to 14 mm. at 2000 m. *Subject Headings:* **Snow, Alps.**—*C.E.P.B.*

2.3–136 551.578.45(42)

Purday, G. A., **April snow.** *Weather*, 5(12):425, Dec. **1950.** 4 photos. **DWB**—Note of depth of 10–12 inches at Sanderstead, Surrey, April 26, 1950. *Subject Headings:* **Snowstorms, England.**

2.3–137 551.578.45(779)

Wiggin, B. L., **Great snow of the Great Lakes.** *Weatherwise*, 3(6):123–126, Dec. **1950.** fig., map, 2 photos. **MH-BH**—Heaviest snows in past 75 years in Great Lakes regions listed and problems associated with such storms discussed. Lee (southeast) shores of lower Great Lakes most subject to sudden snowstorms. Atmospheric and topographic (lake, etc.) conditions necessary for such storms enumerated. *Subject Headings:* **Snowstorms, Great Lakes Region.**—*M.R.*

2.3–138 551.578.46(436)

Steinhäusser, H., **Über die Bewertung der Schneeverhältnisse alpiner Orte auf Grund der Abhängigkeit der Andauer der Schneedecke, der mittleren maximalen Schneehöhe und ihrer Eintrittszeit von der Seehöhe.** [On the evaluations of the snow conditions of Alpine places from the dependence of the duration of the snow cover, the mean maximum snow depth and its date of occurrence on the height above sea level.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):120–128, **1950.** 2 figs., 4 tables, 9 refs., 4 equations. German, English and French summaries p. 120–121. **MH-BH**—Average date of max. snow depth in Alps increases upwards (with local irregularities) from Jan. 20 at 200 m., Feb. 11 at 1000 m., Feb. 14 at 1250 m. and May 29 at 3000 m. Correlation with height .77, with annual precipitation only .35, but with proportion falling as snow .76. Very similar relations are shown by max. depth of snow. The "normal altitude" is an index of duration, mean maximum depth and its date of occurrence. (*See item* 7–98 in July 1950 *Meteorological Abstracts.*) *Subject Headings:* **Snow cover, Austria.**—*C.E.P.B.*

2.3–139 551.578.7(54)

Agarwala, K. S., **Sizes and shapes of hailstones in India.** *Indian Journal of Meteorology and Geophysics*, 1(4):309–311, Oct. **1950.** 14 refs. **DWB**—Reference is made to numerous cases of extremely large or damaging hailstones which have been reported in India and elsewhere. Entire villages have been wiped out, with as many as 250 people killed and hailstones of 7½ pounds reported. Shapes are reported usually with reference to other spherical objects so are probably round in most cases, though odd or irregular shapes often occur. Need for systematic reporting of size and shape, weight, etc. stressed. *Subject Headings:* **Hail, India.**—*M.R.*

HYDROMETEOROLOGY

2.3–140 551.579

*García-Quintero, Andrés, **Hydrology of Mexico.** *American Society of Civil Engineers, Proceedings*, Vol. 76, Separate No. 38, Oct. **1950.** 17 p. 7 figs., 6 tables, 5 refs. **DLC**—A concise but analytical treatise on rainfall in Mexico, beginning with description (and charts) of orography, air masses and fronts, cyclones, etc. that control rainfall; then taking up rainfall by regions (by months), the relation of rainfall to runoff and a comparison with rivers in the United States; hydrographs of rivers in Mexico and maximum discharges at 137 places in Mexico are given in a detailed table. *Subject Headings:* **Hydrology, Rainfall, Mexico.**—*M.R.*

2.3–141 551.579:551.491.54

van Eimern, Josef, **Meteorologisch bedingte Kleinschwankungen des Grundwasserstandes.** [Small oscillations of ground water level due to meteorological causes.] *Annalen der Meteorologie*, 3(7–8):215–233, **1950.** 4 figs., 9 refs. German and English summaries p. 215. **DWB**—Continuous registration of ground water level at Rheinkamp on Lower Rhine showed, in addition to fluctuations caused by precipitation and ground water flow, numerous small variations up to 4 cm. These are traced to three causes: variations of barometric pressure causing nearly opposite changes of water level; evaporation on hot summer days causing a fall by day and a rise by night (summer type); and in winter with freezing at night and thaw by day, a fall at night (winter type) due to downward pressure of freezing surface soil. *Subject Headings:* **Hydrology, Ground water variations.**—*C.E.P.B.*

2.3–142 551.521.2:551.579.2

Miller, David H., **Insolation and snow melt in the Sierra Nevada.** *American Meteorological Society, Bulletin*, 31(8):295–299, Oct. **1950.** 2 figs., table, 6 refs. **MH-BH**—Insolation and other weather factors and effect of forest canopy were studied in relation to snow pack and stream flow in the Central Sierra of California during 1945–1946. Work at the Central Sierra Snow Laboratory, near Donner Pass, summarized. Conclusions regarding effect of heat and solar radiation on density and snow melt discussed and illustrated graphically. Most of heat supplied to snow came from direct solar radiation, and most heat absorbed by snow goes to melting, some is lost in long wave radiation. *Subject Headings:* **Snow melt, Insolation, Sierra Nevadas, California.**—*M.R.*

2.3–143 551.577:551.579.2(494)

†*Gygax, F., **Niederschlag und Abfluss im Einzugsgebiet der Magliasina.** [Precipitation and runoff in the catchment area of Magliasina.] (In *Zum Wasserhaushalt des schweizer Hochgebirges, Band III, Forschungsgebiet* Nr. 16—Magliasina. Bern, Kümmerly & Frey, **1948.** 100 p. 68 figs., 4 maps, 36 tables, 92 refs.) At head of title: *Beiträge zur Geologie der Schweiz—Geotechnische Serie, Hydrologie*, 4. Lfg. Herausgegeben von der Geotechnischen Komission der Schweizerischen Naturforschenden Gesellschaft gemeinsam mit dem chem. Institut für Gewässerkunde der Eidgenössischen Technischen Hochschule in Zürich. **DWB**—This is a model hydrological study of the Magliasina Basin whose area is 21.97 km.^{2} It is based upon 6½ years of records. The geology, geomorphology, geography and vegetation are described and illustrated with photographs and maps. Mean monthly course of temperature, insolation, relative humidity and wind frequency are discussed. The precipitation regime, springs and drainage are described. The relationship between precipitation and drainage is analyzed in terms of total annual values, drainage coefficient, monthly values and highwater peaks. The monthly hydrologic balance is calculated and evaporation is determined by the open pan method of Wild. The entire discussion abounds in tables, diagrams and graphs. *Subject Headings:* **Hydrologic cycle, Precipitation, Runoff, Magliasina Basin, Switzerland.**—*I.L.D.*

2.3–144 551.579.2:551.574.42

*Rink, Josef, **Die Schmelzwassermengen der Nebelfrostablagerungen.** [Amount of thaw-water from rime deposits.] *Germany, Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 5(7), **1938.** 26 p. 20 photos, 20 tables, 6 refs. **DLC**—A study of the amount of thaw water obtained from deposits of rime at the Schneekoppe Observatory, situated 1602 m. above sea level. The method of collecting rime samples and measuring the thaw water is described. General weather situation associated with rime deposition is discussed. Data on mean hourly amounts of thaw water, daily totals of thaw water and total amounts of thaw water obtained during 1936–1937 are given. The influence of temperature, fog, cloudiness, wind direction and wind intensity, elevation and insolation upon rime deposition and the relationship between air masses and rime deposition are analyzed. *Subject Headings:* **Runoff measurements, Rime deposits, Mountain meteorology, Schneekoppe Observatory, Czechoslovakia.**—*I.L.D.*

2.3–145 551.579.4(09)

Munn, R. E., **Early Greek explanations of the Nile floods.** *Weather*, 5(10):349–351, Oct. **1950.** ref. **DWB**—Based on material from **History of inductive sciences** by W. Whewell, 1859. *Subject Headings:* **Nile floods, History.**

2.3–146 551.579.4:551.555:551.543

Parker, Garald C. and Stringfield, V. T., **Effects of earthquakes, trains, tides, winds, and atmospheric pressure changes on water in the geologic formations of southern Florida.** *Economic Geology*, 45(5):441–460, Aug. **1950.** 5 figs., table, 19 refs. **DLC**—Water level in wells varied with many other factors than water availability: pressure from tides, the atmosphere, wind, seismic waves, etc. produce changes which are different in artesian than in other wells. Study of relations between water level and these factors gives information about the structure of the earth around the well. Chart shows observations on rainfall, pressure and water level at Miami during one week in Oct. 1944 (hurricane). *Subject Headings:* **Ground water variations, Hurricanes, Wind effects, Miami, Florida.**—*M.R.*

2.3–147 551.579.5

Bosazza, V. L., **Infiltration to underground of rainwater.** *Nature, London*, 166(4217):344–345, Aug. **1950.** photo. **DWB**—In dry regions of South Africa rock is gravel on fissured limestone and some 60% of the rainfall passes into subsoil, compared with 3% in region of high rainfall. Estimated from quantity of water pumped from mines. *Subject Headings:* **Percolation, South Africa.**

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

2.3–148 551.582

Brose, Karl, **Klimagramme.** [Climagrams.] *Meteorologische Rundschau*, 3(9–10):223–224, Sept.–Oct. **1950.** refs. **DWB, MH-BH**—Sets out diagrammatic tables giving means and extremes of various elements for 20 stations in all parts of the world. Continuation of article in *Meteorologische Rundschau*, 2:244–245, 1949. *Subject Headings:* **Climatology, Climagrams.**—*C.E.P.B.*

2.3–149 551.582(944)

*Warren, H. N., **Results of rainfall observations made in New South Wales, Sections I–VI, Districts 46–75.** Australia, Meteorological Branch, **1948.** 546+p. numerous tables, 38 charts, 4 append. **MH-BH, DWB**—Includes detailed monthly and annual records of rainfall, temperature, humidity, floods, cyclones and local storms; notes on flood warning service and floods (1788–1945); tables of maximum flood heights (1888–1945) and storms (1914–1945). Index of about 2000 stations; discussion of relation between climate and principal industries. Also contains mean isohyetal charts for year, months, seasons, relationships between seasons and annual total, variability of rainfall, etc. *Subject Headings:* **Climatology, Precipitation data, New South Wales.**—*M.R.*

CLIMATIC VARIATIONS

2.3–150 551.583

Labrijn, A., **Verandert ons klimaat?** [Is our climate changing?] *Hemel en Dampkring*, 48(10):170–173, Oct. **1950.** fig. **DLC**—A brief and popular review of evidence that the world climate has been changing during the past 200 years and has been warming up. Ten year means of temperature amplitudes from 1750 to 1950 in Europe indicate climatic oscillations, characterized by increasing maritime influence up to 1920 and increasing continentality since 1920. The mean annual temperature is rising; the glaciers have been receding since the middle of the 19th century; the tree line is moving northward and cod have migrated as far as 74°N latitude. *Subject Heading:* **Climatic changes.**—*I.L.D.*

2.3–151 551.583.1:523.74

Kosiba, Aleksander, **Zagadnienie współczesnych oscylacji klimatycznych.** [The contemporary climatic oscillations.] *Czasopismo Geograficzne*, Lodz, 20(1–4):31–58, **1949.** 3 figs., 2 tables, 64 refs. English summary p. 58. **DLC**—Shows smoothed variations of temperature and precipitation at Warsaw, Wroclaw and Berlin for 1851–1948, Berlin also for 1749–1948, by seasons, and comparison with sunspots. Winter temperature has a minimum just after spot max. and a secondary min. just before spot min. Spring resembles winter. Summer temperature shows the reverse of this relation; hottest summers come in same period as coldest winters. Maximum winter precipitation usually occurs in cold winters. *Subject Headings:* **Climatic variations, Sunspots, Warsaw, Breslau, Berlin.**—*C.E.P.B.*

2.3–152 551.583.1:551.524.34 551.543.4 551.577.34

Lysgaard, Leo, **On the present climatic variation.** Royal Meteorological Society, Centenary Proceedings **1950**:206–211. 2 figs. table. **MH-BH**—Severe winters have recently become colder and mild ones milder; cool summers less cool but warm ones no warmer. Cold winters are attributed to blocking at 500 mb. World charts show change of temperature and pressure in Jan. 1881–1910, 1911–1940. Maximum temperature rise was in Arctic. Changes of precipitation variable. Some negative correlation coefficients between temperature and sunspots are quoted. *Subject Headings:* **Climatic variations, Temperature variations.**

2.3–153 551.583.2:633(611)

†Bois, Ch., **Les vicissitudes des cultures et le climat de la Tunisie dans l'histoire.** [Changes in agriculture and the climate of Tunisia in history.] *La Météorologie*, 4th Ser., No. 18:111–116, April–June **1950.** 31 refs. French, English and Spanish summaries p. 111. **DWB**—Historical and literary sources indicate that sugar cane, cotton, indigo, bananas, etc., were cultivated in Tunis during some of the centuries since A.D. 900, and not during others, giving a clue to climatic changes. However, changes have not been severe. *Subject Headings:* **Climatic variations, Agriculture, Tunis.**—*M.R.*

2.3–154 551.583.3

Faegri, Knut, **On the value of palaeoclimatological evidence.** Royal Meteorological Society, Centenary Proceedings **1950**:188–195. 2 figs., 10 refs. **MH-BH**—Criticizes value of palaeoclimatological evidence citing especially IVERSEN'S work (*see item* G–172 in July 1950 *Meteorological Abstracts*) interpretation of glacial and pluvial periods, conclusions from local observations and slowness of reaction of many factors. The objective is to establish the circulation patterns of former periods. *Subject Heading:* **Climatic changes.**

2.3–155 551.583.3:551.35

Ovey, C. D., **On the interpretation of climatic variations as revealed by a study of samples from an equatorial Atlantic deep-sea core.** Royal Meteorological Society, Centenary Proceedings **1950**:211–215. 2 figs., 2 tables, 5 refs. **MH-BH**—Calcitic foraminifera from a core in 1°10′N., 19°50′W. are classified into cold, temperate and warm. Experiments showed that results are accurate. They indicate a cool period and a sharp rise bringing in the Climatic Optimum. Samples indicating a higher surface temperature have a higher percent of CO_2. *Subject Headings:* **Climatic changes, Bottom samples, Atlantic Ocean.**

2.3–156 551.585:551.573

Curé, P., **La nouvelle classification des climats de Thornthwaite.** [Thornthwaite's new climatic classification.] *La Météorologie*, 4th Ser., No. 18:99–106, April–June **1950.** 6 refs., equations. French, English and Spanish summaries p. 99. **DWB**—Thornthwaite's method of calculating potential evapotranspiration, the assumptions underlying his new climatic classification, the calculation of indices of aridity and humidity and the use of evapotranspiration as a measure of thermal efficiency are discussed. The author asserts that the calculations necessitated by Thornthwaite's formulas are too complex, that the formulas must be modified before they can be applied to the classification of other climates than those of the United States and that the assumption that the effectiveness of aridity is 6/10 of that of humidity may not be

universally valid. It is suggested that further precision of the concept of potential evapotranspiration could be sensed by measurements of actual evapotranspiration. *Subject Headings:* **Climatic classification, Evapotranspiration.**—*I.L.D.*

2.3–157 551.585.7

Baranov, S. and Pokrovskaia, Taisia, **Rabota meteorologicheskoĭ gruppy EKNE 1935 g.** [Meteorological observations made on the Elbrus by the Complex Expedition of the Academy of Sciences of the USSR (1935).] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 199–209. 2 figs., 2 photos, 2 tables, 2 refs. Summary in English p. 207, 209. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II]) **DLC**—The meteorological data summarized deal with the direction and velocity of the winds on Mount Elbrus, the changes of temperature with elevation and the dependence of these changes upon surface relief; and with the relationship of atmospheric humidity to air masses. *Subject Headings:* **Mountain meteorology, Elbrus expedition, Caucasus Mountains, U.S.S.R.**—*I.L.D.*

BIOCLIMATOLOGY—APPLIED CLIMATOLOGY

2.3–158 551.586:612

Bornschein, H., **Untersuchungen über die Hauttemperatur bei Sauerstoffmangel. 2. Mitteilung.** [Investigations of the skin temperature in a lack of oxygen. Part 2.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 2(1–2):134–139, **1950.** table, 18 refs. German, English and French summaries p. 134–135. **MH-BH**—Experiments on oral injection of glucose in 10 males with uncovered extremities at 25°C, R.H. 50% in air with 21, 11 and 9% oxygen confirmed that slight hypoxia [lack of oxygen] at a nominal height of 4700 m. inhibits the reflex dilatation caused by covering the extremities. At a nominal height of 6000 m. more marked hypoxia overcomes the effect of covering. The effect of slight hypoxia is counteracted by 100 gm. glucose, but this has no effect in marked hypoxia. *Subject Headings:* **Skin functioning, Medical meteorology.**—*C.E.P.B.*

2.3–159 551.586:612

Brumshteĭn, V. I., **Poteri vlagi chelovekom v pokoe pri razlichnoĭ temperature vozdukha.** [Loss of moisture by resting individuals under various atmospheric temperatures.] *Gigiena i Sanitariia*, No. 12:12–18, Dec. **1950.** 2 figs., 5 tables. **DLC**—Moderately clothed individuals (two men and two women) were exposed to air temperatures which varied from 5° to 25.6°C. with 44–59% relative humidity; the same subjects clothed more lightly were subjected to air temperatures of 29–32°C. with 29% relative humidity. Moisture loss was determined by weighing subjects on a balance having sensitivity 0.24 grams. Data on the loss of moisture at the various atmospheric conditions and on the concomitant skin temperatures are given. Also the effect of layers of clothing upon moisture loss between temperatures of 9.8° and 22°C. with 44–63% relative humidity was investigated. Between 5.3 and 30.6°C. men lost 31.4 to 65.8 grams/hour and women 29.10 to 44.3 grams/hour. A marked increase in moisture loss occurred at 30.6°C. Individual variability in moisture loss was greatest between 29–32°C. In a two hour experiment the moisture loss declined at air temperature below 15.3°C., but at 31°C. it rose sharply and approached equilibrium at end of two hours. The amount of moisture loss increased with increasing layers of clothing. The sensation of "comfort" was felt at 15.8°C. and of distinct warmth between 21.4 and 25.6°C. *Subject Headings:* **Moisture loss, Human activity, Physiology.**—*I.L.D.*

2.3–160 551.586:612 551.54

Kronheim, Georg and Prokof'eva, E. G., **Vliianie nekotorykh faktorov gornogo klimata na obmen veshchestv.** [The influence of certain factors of mountain climate on metabolism.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 469–486. 11 figs., 2 photos, 11 refs. Summary in English p. 485–486. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II]) **DLC**—Experiments on

white mice indicate that reduced atmospheric pressure, at an altitude of 500 m., increases the relative weight of the liver, spleen, lungs and heart. It increases the blood sugar content but diminishes the content of nonprotein nitrogen in the blood. Light increases the relative weight of the heart, lungs and kidneys, but diminishes that of the spleen. It also increased both sugar content and nonprotein nitrogen content of the blood. *Subject Headings:* **Mountain meteorology, Physiological climatology, Medical climatology, Atmospheric pressure effects, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.3–161 551.586:612(43)

Leistner, Walter, **Das Wattenmeer-und Küstenklima Nordfrieslands und sein Einfluss auf den menschlichen Organismus.** [The climate of the North Sea and the coastal climate of North Friesland and its influence upon the human organism.] *Germany, Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 5(2), **1938.** 17+p. 10 figs., 14 refs. **DLC**—The climate of North Friesland is described by means of 5 day averages of the various meteorological variables over a period of four years, since monthly averages fail to reveal the individual weather phenomena which may influence the physiological reactions of the organism. The climatic role of the shallow sea and the relationship between duration of sunshine, air and water temperature are discussed. The annual march of wind velocity, the annual frequency of sea breezes and the annual march of air temperature, of duration of sunshine, of cloudiness and of precipitation are described. The annual march of equivalent temperature of the air and its relationship to wind velocity is represented by means of a climatogram. The author discusses the technique of measuring skin temperature and humidity by the Robitzsch method and the influence of climate upon the nerve receptors in the skin. He summarizes various opinions regarding the influence of the North Sea climate upon digestion, metabolism, etc. *Subject Headings:* **Bioclimatology, Acclimatization, Climatotherapy, North Sea, Northwest Germany.**—*I.L.D.*

2.3–162 551.586:612

Vladimirov, G. E. and Raĭko, Z. A., **Vliianie shtandartnoĭ myshechnoĭ raboty v vysokogornykh usloviiakh na molochnuiu kisloty krovi.** [The influence of standard muscular work at high altitudes on the lactic acid content of the blood.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 321–335. 9 tables, 26 refs. Summary in English p. 334–335. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II]) **DLC**—The lactic acid content of the blood of twenty-four persons was examined during rest and after muscular work at altitudes of 3000, 4250 and 5315 m. At an altitude of 3000 m. the lactic acid content, both at rest and after work did not differ from values observed in the plain under similar conditions. At 5315 m. the lactic acid content at rest increased in all individuals. After performing muscular work at altitudes of 4250 and 5315 m. lactic acid in the blood increased only slightly. The authors believe that their experimental evidence fails to agree with the assumption that the rise of the lactic acid content of blood is caused by a decrease in the supply of oxygen to the tissues. *Subject Headings:* **Mountain meteorology, Physiological climatology, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.3–163 551.586:612

Vladimirov, G. E., Miliushkevich, G. F., Rikkl', A. V. and Epshteĭn, IA. A.. **Vliianie akklimatizatsii na gazovyĭ sostav krovi.** [The influence of acclimatization on blood gases.] (In Trudy El'brusskoĭ Ekspeditsii Akademii Nauk, SSSR, i Vsesoiuznogo Instituta Eksperimental'noĭ Meditsiny 1934 i 1935. [Reports of the Elbrus Expedition 1934 and 1935.] Moscow, **1936.** p. 337–349. 3 figs., 11 tables, 11 refs. English summary p. 348–349. [*Ak. Nauk, SSSR, Komissiia po izucheniiu stratosfery*, Tom II]) **DLC**—The effect of altitude upon the CO_2 capacity of blood and the CO_2 content of venous blood and the O_2 capacity of blood and the O_2 content of venous blood was studied in ten persons during rest and after work. The CO_2 capacity of blood and the CO_2 content of venous blood begin to decrease at 3000 m. and continue to decline at higher elevations. After acclimatization at high altitudes the O_2 capacity of blood increases; the O_2 content of venous blood decreases. The difference in pH of arterial and of venous blood produced by the low capacity for CO_2 at high elevations is an

important factor in acclimatization to high altitude. Lactic acid can account only partly for the decreased CO_2 capacity of the blood. *Subject Headings:* **Mountain meteorology, Physiological climatology, Acclimatization, Elbrus Expedition, U.S.S.R.**—*I.L.D.*

2.3–164 551.586:628.8

†Amelung, W., **Künstliches Klima.** [Artificial climate.] (In **Lehrbuch der Bäder- und Klimaheilkunde,** Heinrich Wilhelm Vogt (ed.), Berlin, Springer, **1940.** p. 950–966. figs., refs.) **DLC**—Artificial climates are defined as climates in which temperature, humidity and other climatic factors are altered by man. After a brief discussion of clothing and city climates, the author discusses the characteristics of artificial climates of enclosed spaces created for hygienic and therapeutic purposes. The measurement of comfort by the methods of Linke and of Bradke and Liese are described. The author considers the principles and problems of air conditioning work rooms and therapeutic rooms for the treatment of allergy, respiratory diseases, etc.; the special characteristics of artificial as compared with natural climates; the therapeutic value of wind movement, aerosol and ionic properties of air conditioned rooms; the importance of artificial sunlight and the general problem of climatic therapy by means of air conditioning. An extensive bibliography is appended. *Subject Heading:* **Artificial climates.**—*I.L.D.*

2.3–165 551.586:63(495)

Nuttonson, M. Y., **Ecological crop geography of Greece and its agroclimatic analogues in North America.** *Washington, D. C., International Agro-climatological Series,* No. 5, American Institute of Crop Ecology, **1947.** 17 p. fig., table, refs. **DA**—Brief discussion of climate of Greece. More complete discussion of ecology of crops in Greece. Table gives mean temperature, frost dates, average precipitation for each month and station locations together with agroclimatic parallels in the United States for 34 stations in Greece, Crete and Aegean Islands. In general, Greece compares with various parts of California. *Subject Headings:* **Ecoclimatology, Agricultural climatology, Greece.**—*M.R.*

2.3–166 551.586:632

Waggoner, Paul E., **Temperature lapse rates over bare ground and over potato plots on peat and mineral soils.** *American Meteorological Society, Bulletin,* 31(9):326–329, Nov. **1950.** 3 tables, 4 equations. (Abridgement of thesis which was abstracted in *Meteorological Abstracts,* item 1-149, Jan. 1950.) **MH-BH**—Temperature measurements were made by means of a hand-aspirated psychrometer at heights of $\frac{1}{4}$, 15 and 60 inches above bare ground and above potato plots. The lowest level of $\frac{1}{4}$ inch satisfied the requirement of decreasing experimental error due to the laminar flow layer. The equations $y = T_{\frac{1}{4}} - T_{60}$ and $z = \frac{1}{2}(T_{\frac{1}{4}} - 2T_{15} + T_{60})$ measure lapse rate and lapse rate curvature, respectively. Analysis of variance of lapse rates was carried out with reference to location, time of day, thermodynamic classification of the air mass, wind speed, total sky cover and date. A consideration of the variances of estimates of lapse rate means and of comparisons of lapse rates indicated that there was little evidence for actual differences of mean lapse rate between locations or differences of mean temperatures with height. Moreover, the mean temperature differences observed are of slight biological importance and instrument shelter temperatures are suitable for potato blight forecasts. *Subject Headings:* **Microclimatology, Agricultural climatology, Vertical temperature gradient, Potato blight forecasting.**—*I.L.D.*

MISCELLANEOUS APPLICATIONS

OPTICAL PHENOMENA

2.3–167 551.593.63

§Stevens, Gene C., Fritz, Sigmund and List, Robert J., **Two halo displays over eastern U. S. in December 1948.** *American Meteorological Society, Bulletin,* 31(9):318–321, Nov. **1950.** 5 figs., 2 refs. **MH-BH**—The authors describe in detail two halo displays that were observed at Washington, D. C. on December 10 and December 21, 1948 and that were accompanied by mock suns and colored arcs. A study of upper air conditions at the time of the displays indicated that the lapse rate was stable at a level which coincided approximately

with the height of the cirrostratus clouds. This substantiates the theory that parhelia, circumzenithal arcs and parhelic circles occur when the air at the ice crystal level is nonturbulent. Moreover, analysis of upper air constant pressure charts indicated that the air between 18,000 and 30,000 feet, the area of diminishing lapse rate, maintained a uniform movement in the same direction so that turbulence was minimized even though the winds exceeded 100 mile per hour. Weather maps show the areas of cirrus clouds, precipitation, surface pressure pattern and air motion at the cirrus level at the time of the displays. *Subject Headings:* **Haloes, Washington, D. C.**—*I.L.D.*

2.3–168 551.593.652

Dieterichs, Heinz, **Mother-of-pearl clouds and their problems.** *Geofisica Pura e Applicata*, 16(3–4):128–132, April–June **1950.** 2 figs., 18 refs. In English. **MH-BH**—A summary of early research and observations on mother-of-pearl clouds, their origin, frequency, location, etc. Includes suggestions for future observation and investigation of stratosphere (wind, sound propagation, nuclei, lapse rates, etc.) at time of such occurrence. Statement is made that no mother-of-pearl clouds were reported from 1892 to 1925 anywhere on earth. *Subject Heading:* **Nacreous clouds.**—*M.R.*

2.3–169 551.593.652

Williams, Geo. C., **Nacreous clouds observed in southeastern Alaska January 24, 1950.** *American Meteorological Society, Bulletin*, 31(9):322–323, Nov. **1950.** figs., 2 tables. **MH-BH**—A detailed description of the nacreous clouds from their first appearance at 0630 o'clock to their dissipation around 1100 o'clock is given. The elevation of the clouds measured by triangulation (Anchorage—Cordova) was between 10 and 11 miles. At 52,000 ft a temperature of −62°C. was recorded at 0430 and −63°C. at 1630 local time. The accompanying synoptic situation was characterized by an intense warm high with the surface center over the Aleutian Islands extending to a considerable elevation and probably controlling the circulation at the elevation of the nacreous clouds. A photograph of the clouds is given. *Subject Headings:* **Nacreous clouds, Alaska.**—*I.L.D.*

ELECTRICAL PHENOMENA

2.3–170 551.594.21:551.577:551.576

†Küttner, Joachim, **The electrical and meteorological conditions inside thunderclouds.** *Journal of Meteorology*, 7(5):322–332, Oct. **1950.** 12 figs., 25 refs. **MH-BH**—A comprehensive graphical and descriptive analysis of observations made during 125 storms at Zugspitze Observatory (1945–1948). The electric field (horizontal and vertical potential gradient and position of charge) in the thunderclouds, an analysis of 825 lightning strokes, results of observation of precipitation, temperature, ice crystals, hail, freezing level, etc. discussed and illustrated. Charge distribution relative to airflow, precipitation and life cycle also considered. (*Same item* as H–238 in Aug. 1950 *Meteorological Abstracts*) *Subject Headings:* **Thunderstorm electricity, Thunderstorm rainfall, Thunderclouds, Zugspitze Observatory, Germany.**—*M.R.*

2.3–171 551.594.5

Aurorae. *Marine Observer*, 20(150):198–199, Oct. **1950.** fig. **MH-BH**—On Oct. 15, 1949, in North Atlantic and Australian waters; on Oct. 20, in North Atlantic; on Dec. 4–5, in Icelandic waters auroras were observed. *Subject Heading:* **Auroras.**

2.3–172 551.594.5

Robley, R., Bricard, J. and Kastler, A., **Le spectre de l'aurore boréale du 25 au 26 janvier 1949.** [The spectrum of the aurora borealis of January 25 to 26, 1949.] *Annales de Géophysique*, 6(1):66–67, Jan.–March **1950.** 2 figs., table, 3 refs. **MH-BH**—The author describes a very intense aurora observed at the Swedish observatory of Abisko. A curve of dispersion was constructed: from 6500 Å to 4500 Å with neon radiation, and from 4500 Å to 3500 Å with the best known auroral radiation. A table in which the measured radiations are compared with values obtained by VEGARD is presented. Also, the infra-red spectrum of the aurora has been examined. *Subject Heading:* **Auroral spectra.**—*I.L.D.*

2.3–173 551.594.6

Kerr, J. F., **Radio superrefraction in the coastal regions of Australia.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 1(4):443–463, Dec. **1948.** 14 figs., 9 refs. **MH-BH**—A study of the geographical and meteorological factors affecting superrefraction of radio or radar echoes in and near Australia. Based on reports from 112 RAAF radar warning stations (March 1944 to August 1945), the study shows that: 1) seasonal and diurnal variations are marked, but opposite on the north and south coasts (max. in summer in the South); 2) the most intense superrefraction occurs in the West Coast region; and 3) the most favorable synoptic condition is hot, dry air from interior above cool, moist sea air moving ashore. *Subject Headings:* **Radar echoes, Anomalous radio propagation, Australia.**—*M.R.*

2.3–174 551.594.6:621.396.9

Ligda, Myron G. H., **Lightning detection by radar.** *American Meteorological Society, Bulletin*, 31(8):279–283, Oct. **1950.** 6 figs., 4 refs. **MH-BH**—A method of lightning detection by radar was worked out in 1945 by U. S. Air Weather Service observers. The Weather Radar Research Project of M.I.T. verified conclusions of SWEENEY and PETERSON and took the first radar photographs of lightning strokes. Equipment described and PPI-scope of SCR 615B radar reproduced. Value lies in ability to locate cells in a cloud mass which are electrically active. *Subject Headings:* **Radar storm detection, Sferics.**—*M.R.*

2.3–175 551.594.6:551.577.1

Mather, John R., **An investigation of the dimensions of precipitation echoes by radar.** *American Meteorological Society, Bulletin*, 30(8):271–277, Oct. **1949.** 4 figs., 4 tables, 8 refs. **DWB**—A study of sizes and intensities of precipitation echo bands shows how cold front rain may be distinguished from warm front and unstable areas from stable. *Subject Headings:* **Radar echoes, Precipitation.**—*M.R.*

2.3–176 551.594.6:551.578.1

Perrie, D. W., **The rain required for a radar echo.** *American Meteorological Society, Bulletin*, 30(8):278–281, Oct. **1949.** 3 figs., 7 refs. **DWB**—Measurements were made in 1945 at Clinton, Ontario, to determine amount of rain necessary to produce a radar echo at different ranges (145 km. to 555 km.). Results shown graphically. *Subject Headings:* **Radar echoes, Rain.**—*M.R.*

ACOUSTICAL PHENOMENA

2.3–177 551.596.1:551.510

Abbey, R. L. and Barlow, G. E., **The velocity of sound in gases.** *Australian Journal of Scientific Research, Ser. A, Physical Sciences*, 1(2):175–189, June **1948.** 7 figs., 5 tables, 20 refs., 3 equations. **MH-BH**—Carefully conducted laboratory measurements of sound speed were made in gases at pressures from one atmosphere down to 5 mm. (air, nitrogen, oxygen, carbon dioxide and methane). Theory, instrumentation, tube correction and results discussed and illustrated by diagrams, charts and tables. *Subject Headings:* **Sound velocity, Carbon dioxide.**—*M.R.*

2.3–178 551.596.9

Chiplonkar, M. W., Wooldridge, G. C., **The Barisal guns.** *Weather*, 5(12):425, Dec. **1950.** **DWB**—Further letters about subject discussed in *Weather* for April and Aug. 1950. Chiplonkar attributes phenomena to subterranean noises transmitted through the stratosphere. *Subject Headings:* **Brontides, Acoustical phenomena, India.**

PART II. A SELECTIVE ANNOTATED BIBLIOGRAPHY ON SOIL TEMPERATURE

By: *N. T. Zikeev*

EXPLANATORY NOTE

Out of hundreds of articles written during the past century on the subjects of soil temperature, earth temperature, frozen ground and heat exchange in the soil, about two hundred have been selected to present a geographical and historical survey of the progress in research and measurement of soil temperature from a meteorological or agricultural point of view. Since articles on engineering or geological aspects of frozen ground, permafrost and related subjects comprise a field for a separate bibliography, they have been withheld, as a rule. As can be seen from the following outline, some of the more comprehensive works on peripheral aspects, especially those containing good bibliographies, have been included. In most cases, no attempt has been made to provide informative abstracts in this bibliography, as the nature of the subject matter is not one which requires anything more than an amplification of the title.

Articles which contain good soil temperature data are marked with the usual asterisk (*).

OUTLINE OF CONTENTS

SUBJECT OUTLINE

Physical Aspects of Soil Temperature and Heat Exchange
- Albedo of soil, 2C–107
- Evaporation, 2C–12, –133
- Glaciation, 2C–62
- Heat exchange, 2C–116, –128, –189
- Energy exchange, 2C–12, –107
- Ice formation, 2C–52
- Percolation, 2C–86
- Soil moisture, 2C–12, –36, –42, –52, –73, –86, –99, –113, –120, –133, –147, –159, –184
- Solar radiation, 2C–12, –19, –138
- Thermal conductivity, 2C–2, –3, –10, –25, –44, –48, –76, –81, –90, 92, –104, –123, –131, –151, –152, –166, –169

Environmental and Meteorological Influences
- Climatic influences, 2C–143
- Cover influences, 2C–28, –44, –56, –75, –78, –109, –125, –133, –146, –149
- Forest influences, 2C–179, –187
- Radiation effects, 2C–56
- Rainfall effects, 2C–186
- Snow cover effects, 2C–24, –26, –83, –102, –103, –113
- Snow retention, 2C–184
- Vegetative influences, 2C–37, –102, –108, –127, –187

Applications to Agriculture and Bioclimatology
- Agricultural climatology, 2C–110, –118, –135
- Bioclimatology, 2C–1, –32, –46, –50, –63
- Climatology, 2C–1, –7, –18, –61, –143, –177
- Forestry, 2C–102
- Microclimatology, 2C–11, –20, –23, –30, –50, –51, –157, –158, –167
- Micrometeorology, 2C–182
- Phenology, 2C–35
- Plant ecology, 2C–59, –188
- Soil climatology, 2C–85
- Soil erosion, 2C–119
- Paleoclimatology, 2C–137
- Climatic changes, 2C–94

Applications to Engineering and Geology
- Airport construction, 2C–151
- Construction, 2C–100, –158
- Engineering, 2C–39, –40, –150
- Mine temperatures, 2C–20, –90, –132, –175
- Frozen soil, 2C–21, –22, –29, –39 to –41, –43, –45, –62, –65, –67, –72, –94, –100, –109, –120, –126, –143, –157, –165, –183
- Frost action, 2C–60
- Frost heaving, 2C–39, –40, –52, –59, –65 to –68, –70 to –72
- Frost penetration, 2C–49, –82, –83, –108
- Soil freezing, 2C–102, –113, –115, –121, –122, –160, –161, –172, –179
- Permafrost, 2C–55, –87, –100, –110, –111, –137, –144, –150, –151, –158

Instruments, Methods of Observation and Computation
- Methods of computation, 2C–13, –169
- Soil temperature observation, 2C–3, –9, –11, –12, –14, –16, –27, –38, –48, –51, –89, –112, –132, –164, –182
- Soil thermometers, 2C–3, –4, –14, –38, –51, –89, –141, –156, –157, –163, –176
- Ice thermometers, 2C–168
- Instruction for observers, 2C–101

Soil and Air Temperature Data
Climatological data, 2C–137
Air temperature, 2C–6, –8, –9, –57, –84, –116, –129, –139, –162, –167, –185
Earth temperatures, 2C–141, –142, –144, –154, –175
Soil temperature data, 2C–5, –97
Soil temperatures, 2C–1, –3, –5, –7, –9 to –19, –21, –23, –28, –30 to –38, –41, –42, –44, –46, –47, –49 to –51, –53, –54, –56 to –58, –63, –64, –69, –73 to –78, –81, –83 to –86, –88 to –92, –96, –97, –102, –103, –106, –108, –111 to –117, –119, –121, –124, –126 to –131, –133 to –136, –138, –140, –146, –148, –150, –152, –153, –155, –159, –162, –164, –166, –170, –171, –173, –174, –180, –182, –184 to 194
Soil surface temperatures, 2C–6, –8, –93, –95, –99, –149
Surface temperatures, 2C–125, –128, –139, –167
Ice temperatures, 2C–168
Snow temperatures, 2C–179
Snow surface temperatures, 2C–79
Mine temperatures, 2C–20, –90, –132, –175
Well temperatures, 2C–155, –175
Sea temperatures, 2C–114
Form of Work
Atlases, 2C–177
Bibliographies, 2C–165, –192
Glossaries, 2C–148
Textbooks, 2C–7, –111
Symposia, 2C–101

GEOGRAPHICAL OUTLINE

NORTHERN HEMISPHERE, 2C–27
NORTH AMERICA, 2C–22, –55, –83
Alaska, 2C–29, –127, –137, –151
Canada, 2C–9, –10, –49, –53
British Columbia, 2C–62
Northern Canada, 2C–62, –151
Saskatchewan, 2C–53
Yukon Territory, 2C–122
Greenland, 2C–114
Iceland, 2C–47
United States, 2C–6, –21, –23, –40, –49, –61, –84, –136, –155, –183, –191
Maine, 2C–82
Montana, 2C–84
Wisconsin, 2C–108
Michigan, 2C–20
New Jersey, 2C–182
West Virginia, 2C–49
Ohio, 2C–16, –135, –193
Kansas, 2C–130
Manhattan, 2C–130
Colorado
Colorado Springs, 2C–155
California, 2C–57, –74, –117, –139
Davis, 2C–57
Grass Valley, 2C–117
Mexico, 2C–154
Parícutin Volcano, 2C–154
EUROPE
Great Britain, 2C–95, –155
Scotland, 2C–2
Edinburgh, 2C–2
England, 2C–14, –38, –78, –134
Kew, 2C–78
Oxford, 2C–14, –38
Rothamsted, 2C–134
France, 2C–157
Norway, 2C–45
Spitsbergen, 2C–45
Finland, 2C–11
Mustiala, 2C–11
U.S.S.R., 2C–1, –5, –7, –11, –100 to –103, –110, –111, –132, –144, –160, –161, –172, –181, –184, –185
Riga, 2C–185
Leningrad, 2C–5, –11
Pavlovsk, 2C–11
Siberia, 2C–55, –144, –160, –161, –172
Western Siberia, 2C–184
Yakutsk Region, 2C–144
Nukus, 2C–5
Kazan, 2C–102
Dnepropetrovsk Region, 2C–103
Yugoslavia, 2C–31
Belgrade, 2C–31
Hungary, 2C–115, –124
Budapest, 2C–115, –124
Austria, 2C–129
Vienna, 2C–129
Germany, 2C–32, –33, –64, –78, –140, –142, –173, –177, –194
Geisenheim, 2C–173
Hesse, 2C–177
Munich, 2C–82
Potsdam, 2C–78
Silesia, 2C–33
Italy, 2C–17, –18
Venice, 2C–138
ASIA, 2C–5, –55
Cyprus, 2C–97
Palestine, 2C–97
India, 2C–17, –18
Ceylon, 2C–92
Colombo, 2C–92
Japan, 2C–25, –26, –76
Siberia, *see* U.S.S.R.
AFRICA, 2C–155
Belgian Congo, 2C–162, –188
Sahara Desert, 2C–152
Sudan, 2C–97
AUSTRALIA, 2C–5, –186
New South Wales, 2C–186
ARCTIC OCEAN
Novaya Zemlya, 2C–1
PACIFIC OCEAN
Tahiti, 2C–106
ANTARCTIC, 2C–168
POLAR REGIONS, 2C–1

BIBLIOGRAPHY ON SOIL TEMPERATURE

1837

2C–1 551.525:551.586.5(98)

Baer, M., **Expedition en Laponie et à Novaia-Zemlia.** [Expedition to Lapland and Novaya-Zemlya.] *Akademiia Nauk, SSSR, Bulletin Scientifique*, St. Petersburg, 3(5–7):171–191, Dec. 30, **1837.** 7 refs. **DLC**—Description of the conditions of vegetation and climate in Novaya Zemlya, and a comparison with the other parts of northern Europe and Asia. On the basis of his investigations the author found that the layer of soil which thaws in summer is not a deep one, and that frozen soil was found at a depth of 1½ feet; presumably this was the permafrost layer. *Subject Headings:* **Soil temperatures, Climatology, Bioclimatology, Polar Regions, Novaya Zemlya, U.S.S.R.**

1861

2C–2 551.525(410)

Thomson, William, **On the reduction of observations of underground temperature.** *Royal Society of Edinburgh, Transactions*, 22(2):405–427, **1861.** 12 tables, 2 refs. **DLC**—The author analyzed the periodical variations of the soil temperature observations at Edinburgh from 1842–1854 at depths from 3 feet to 24 feet below the surface. On the basis of these data, thermal conductivity of Edinburgh strata is given. *Subject Headings:* **Soil temperatures, Thermal conductivity, Edinburgh, Scotland.**

1875

2C–3 551.525:551.508:551.506.3

*von Litrow, Arthur, **Ueber die relative Wärmeleitungsfähigkeit verschiedener Bodenarten und den betreffenden Einfluss des Wassers.** [Relative thermal conductivity of various types of soil and the influence of water upon it.] *Vienna, Akademie der Wissenschaften, Sitzungsberichte*, 71:99–151, Jan. **1875.** 3 figs., 30 tables, 13 refs. **DLC**—The author gives the history of investigation on the question of heat conductivity of soil. The apparatus and the methods of observation are described and the results of numerous investigations are presented. *Subject Headings:* **Soil temperatures, Thermal conductivity, Soil temperature observation, Soil thermometers.**

2C–4 551.508.26

Wollny, E., **Eine neue Konstruktion der Bodenthermometer für Tiefe von 0.3–1.8 Meter.** [A new design of soil thermometers for depths from 0.3 to 1.8 m.] *Österreichische Gesellschaft für Meteorologie, Zeitschrift*, 10:149–151, May 15, **1875. DWB**—A description of thermometers used for the measurement of soil temperature; and critical remarks on the Lamont soil thermometer, whose wood tubes are easily cracked. *Subject Heading:* **Soil thermometers.**

1879

2C–5 551.525:551.506:(4)(47)(5)(93)

†*Wild, Heinrich, **O temperature pochvy v St.-Peterburge i Nukuse.** [On the soil temperature at St. Petersburg and Nukus.] *Akademiia Nauk, SSSR, Meteorologicheskiĭ Sbornik*, St. Petersburg, 6(4), **1879.** 96 p. 20 tables, 43 refs., 12 equations. **DLC**—A fundamental investigation made in the 19th century. The daily and annual variations of soil temperature are analyzed and the influence of heat conductivity, surface cover, moisture, etc. is considered. Detailed comparison of the results of the observations with the data of 25 other stations in Europe, Asia and Australia is given. *Subject Headings:* **Soil temperatures, Soil temperature data, Leningrad, Nukus, U.S.S.R., Europe, Asia, Australia.**

1884

2C–6 551.525.2:551.521:551.524(73/9)

Ferrel, William, **Temperature of the atmosphere and earth surface.** *U. S. Signal Service, Professional Papers*, No. 13, **1884.** 69 p. 3 figs., 11 tables, numerous equations. **DLC**—In this study the following topics are discussed: the relative distribution and the variations of solar radiation, conditions determining the temperature, and the distribution and variation of the temperature of the atmosphere and the soil surface. *Subject Headings:* **Soil surface temperatures, Solar radiation, Air temperature, United States.**

1891

2C–7 551.582:551.525:(02)(47)

Voeĭkov, Aleksandr Ivanovich, **Meteorologiia.** [Meteorology.] St. Petersburg, **1891.** 165 p. 37 figs., 5 tables. **DLC**—General meteorological data and characteristics of the climatic conditions

in Russia. On pages 29–41 the problems of soil temperature are discussed; some data on soil temperature are given and the effect of its chemical content, the state and color of the surface on the temperature regime is described. *Subject Headings:* **Soil temperatures, Climatology, Textbooks, U.S.S.R.**

2C–8 551.525.2:551.524

von Bezold, W., **Der Wärmeaustausch an der Erdoberfläche und in der Atmosphäre.** [Heat exchange at the earth's surface and in the atmosphere.] *Berlin, (K.) Preussische Akademie der Wissenschaften, Sitzungsberichte,* No. 26, May **1891.** p. 467. **DLC**—Short report on the meeting of May 28, 1891. *Subject Headings:* **Soil surface temperatures, Air temperature.**

1895

2C–9 551.525:551.501:551.524(71)

*Callendar, Hugh L., **Preliminary results of observations of soil temperatures with electrical resistance thermometers, made at the McDonald Physics Building, McGill University, Montreal.** *Royal Society of Canada, Proceedings and Transactions,* 2nd Ser., 1, Sec. 3, 63–84, **1895.** numerous figs. **DLC**—The observations of soil temperature from surface to depth of 9 feet, and the description of resistance thermometers are given. Numerous diagrams show diurnal variations of air and soil temperature for winter months. *Subject Headings:* **Soil temperatures, Air temperature, Soil temperature observation, Canada.**

1896

2C–10 551.525:551.501(71)

*Callendar, Hugh L. and McCleod, G. H., **Observations of soil temperatures with electrical resistance thermometers.** *Royal Society of Canada, Proceedings and Transactions,* 2nd Ser., 2, Sec. 3, 109–126, May **1896.** 4 plates, 3 tables. **DLC**—The results of soil temperature observations from surface to depth of 9 ft are given. This is the continuation of a previous report (*see item* 2C–9). The isothermal diagram is given. The authors studied effects of rainfall and sunshine, and give a table of thermal diffusivity at different depths, dates and seasons. *Subject Headings:* **Soil temperatures, Thermal conductivity, Canada.**

2C–11 551.525:551.501:551.584(471.1)(47)

†*Homen, Theodor, **Über die Bodentemperatur in Mustiala.** [About the soil temperature in Mustiala.] *Societas Scientiarum Fennica, Acta,* Helsinki, 21(9), **1896.** 184 p. 3 figs., numerous tables, 25 refs. **DLC**—Classical investigation containing a great many observations. Methods of observation, influence of the conditions of place of observations, precipitation, and the snow cover described. Heat conductivity, daily and annual variations of the soil temperature analyzed. Comparison of the observations of soil temperature with those at Pavlovsk and Leningrad is made. *Subject Headings:* **Soil temperatures, Soil temperature observation, Microclimatology, Mustiala, Finland, Pavlovsk, U.S.S.R.**

1897

2C–12 551.525.4:551.501:551.521:551.579

*Homen, Theodor, **Der tägliche Wärmeumsatz im Boden und die Wärmestrahlung zwischen Himmel und Erde.** [The daily heat exchange in the soil and radiation between the sky and earth.] *Societas Scientiarum Fennica, Acta,* Helsinki, 23(3), **1897.** 147 p. 5 figs., 10 plates (in append.), numerous tables. **DLC**—The author gives the characteristics of the daily variations of temperature for different kinds of soil, and considers the problems of heat exchange, humidity and evaporation of soil. The problem of the heat exchange between the soil and sky is investigated. Each section is accompanied by numerous data. Many technical problems are treated. *Subject Headings:* **Soil temperatures, Solar radiation, Energy exchange, Soil temperature observation, Soil moisture, Evaporation.**

1901

2C–13 551.525:551.501.4

Everett, Joseph D., **On a method of reducing observations of underground temperature with its application to the monthly mean temperatures of underground thermometers, at the Royal Edinburgh Observatory.** *Royal Society of Edinburgh, Transactions,* 22(2):429–439, **1901.** 11 tables, numerous equations. **DLC**—Mathematical investigation on the question of compiling soil temperature observations. *Subject Headings:* **Soil temperatures, Methods of computation.**

2C–14 551.525:551.501:551.508.26(42)

*Rambaut, Arthur A., **Messung der Bodentemperatur in Oxford im Jahre 1899 mittels 5 Platinwiderstandthermometer.** [The measurement of the soil temperature at Oxford in 1899 with 5 platinum resistance thermometers.] *Meteorologische Zeitschrift*, 18(7):327–329, July **1901.** 2 tables, 5 refs. **DLC**—Short description of 5 platinum resistance thermometers. At Radcliffe Observatory in 1899 measurements were made at depths of 16.5; 45.7; 107.9; 174.0 and 303.5 cm. Monthly mean temperatures are given and discussed. *Subject Headings:* **Soil temperatures, Soil temperature observation, Soil thermometers, Oxford, England.**

2C–15 551.525:551.525.4

Schubert, J., **Zur Theorie der Wärmeleitung im Erdboden.** [On the theory of heat conductivity of soil.] *Meteorologische Zeitschrift*, 36(8):377–382, Aug. **1901.** 4 tables, 8 refs. **DLC**—On the basis of 10–15 years of observations of soil temperature at varying depths the author studied various questions concerning Fourier's and Poisson's theory of heat conductivity as applied to soil. *Subject Headings:* **Soil temperatures, Thermal gradient.**

1902

2C–16 551.525:551.501(71)

Briggs, Lyman, J., **Ground temperature observation at St. Ignatius College, Cleveland, Ohio.** *Monthly Weather Review*, 30:301, **1902.** **DLC**—This is an excerpt from a report of the Meteorological Observatory of St. Ignatius College on soil temperature at a depth of 4 feet. A method for determining soil temperatures is described. *Subject Headings:* **Soil temperatures, Soil temperature observation, Ohio.**

2C–17 551.525:551.506.3(54)

*Dallas, W. L., **Earth-temperature-observations in Upper India.** *Royal Meteorological Society, Quarterly Journal*, 28:283–299, **1902.** 3 figs., 14 tables. **DLC**—The author gives a summary of soil temperature observations at three stations in Upper India (Lahore from 1886 to 1899; Jaipur from 1882 to 1899 and Dehra Dun from 1884 to 1899) at depths from the surface to 45 feet. Mean monthly and annual temperatures are given, and results of observations discussed. *Subject Headings:* **Soil temperatures, India.**

2C–18 551.525:551.506:551.582(54)

*Eliot, Sir John, **Discussion on the results of the hourly observations recorded at 29 stations in India.** *India, Meteorological Dept., Memoirs*, 12, Pts. 2 and 3, p. 31–408, **1902.** 67 plates (in append.), numerous tables. **DLC**—This study gives the results of observations of solar and terrestrial radiation, ground and air temperatures, water vapor pressure, cloud, air movement and air pressure. The data are examined and discussed. The temperature data of the ground at varying depths up to 30 feet at 5 stations are given and diurnal, annual and seasonal temperature variations are presented. *Subject Headings:* **Soil temperatures, Climatology, India.**

2C–19 551.525:551.521:551.506.3

*Knott, C. G., **Solar radiation and earth temperatures.** *Royal Society of Edinburgh, Proceedings*, 23:296–311, **1902.** fig., 10 tables. **DLC**—The amount of solar heat supplied to each square centimeter of the earth's surface is calculated. Mean of soil temperatures for the period of 1879–1887 is used as the fundamental data for soil temperature at depth of 0, 8, 1.4, 3.2 and 6.35 m. The comparison between soil temperatures and solar radiation is discussed. *Subject Headings:* **Soil temperatures, Solar radiation.**

1903

2C–20 551.525.6:551.584.65(77)

Lane, Alfred Church, **Variation of geothermal gradient in Michigan.** *Geological Society of America, Bulletin*, 13:528–529, **1902.** 5 refs. (Abstract.) **DLC**—On the basis of observations in deep mines, the author gives geothermal gradients for 6 places in Michigan. The variations of gradient are from 1 degree in 49 feet to 1 degree in 100 feet. *Subject Headings:* **Mine temperatures, Thermal gradient, Microclimatology, Michigan.**

2C–21 551.525.5(73)

Roberts, M., **Notes on the action of frost on soil.** *Journal of Geology*, 11(3):314–317, April–May **1903.** 4 figs. **DLC**—Some observations on ice formation on soil by mild thawing weather in daytime and air temperature at nighttime as low as 24°F. *Subject Headings:* **Soil temperatures, Frozen soil, United States.**

1904

2C–22 551.525.5:(7)

Tyrrell, J. B., **Crystosphenes or buried sheets of ice in the tundra of Northern America.** *Journal of Geology*, 12(3):232–236, April–May **1904.** figs. **DLC**—The author gives a description of buried sheets or layers of clear ice in alluvial deposits of the Arctic and sub-Arctic of America. *Subject Headings:* **Frozen soil, North America, Arctic.**

1905

2C–23 551.525:551.584(73)

Abbe, Cleveland, **Ice columns in gravelly soil.** *Monthly Weather Review*, 33(4):157–158, April **1905. DLC**—Description of the phenomena of formation of slender columns of ice at the surface of gravelly soil in moist places after a clear, cool night. *Subject Headings:* **Soil temperatures, Microclimatology, United States.**

2C–24 551.525:551.578.46

*Schreiber, Paul, **Studien über Erdbodenwärme und Schneedecke.** [Studies on heat of soil and snow cover.] (*K.*) *Sächsisches Meteorologisches Institut, Jahrbuch* (1901), 19:1–94, **1905.** 57 tables. **DLC**—The relation between soil temperature, frost penetration into soil and snow cover condition are discussed. *Subject Headings:* **Soil temperatures, Snow cover influences.**

2C–25 551.525:551.506.3:(52)

*Tamura, S. Tetsu, **Observations of earth temperature in Japan.** *Monthly Weather Review*, 33:296–302, **1905.** 2 figs., 14 tables, 4 refs., 29 equations. **DLC**—Fourier's theory of the periodic flow of heat is analyzed. The observational data of soil temperatures at Tokyo (at depths of 0.3, 0.6, 1.2, 3.0, 5.0, 7.0 m.) and Nagoya and Osaka at depth of 6.0 m. are discussed and computed. The coefficient of temperature diffusivity, the constants of the harmonic formula, etc., are also computed. *Subject Headings:* **Soil temperatures, Thermal conductivity, Observational data, Japan.**

2C–26 551.525:551.578.46(52)

*Tamura, S. Tetsu, **An account of recent meteorological and geophysical researches in Japan. Part II.** *Monthly Weather Review*, 33:302–303, **1905.** 4 tables, refs. **DLC**—The author describes the investigation of Dr. T. Okado on the thermal conductivity of snow. Hourly observations of temperature at depths of 10, 20, and 30 cm. were undertaken with long-stem mercury thermometers. The data for temperature under the snow are given. *Subject Headings:* **Soil temperatures, Snow cover, Japan.**

1907

2C–27 551.525:551.581:581.501

†*Kühl, W., **Der jährliche Gang der Bodentemperatur in verschiedenen Klimaten.** [Annual variation of soil temperature in various climates.] *Beiträge zur Geophysik*, 8(3–4):499–564, **1907.** 32 tables, 47 refs. **DLC**—A fundamental investigation of soil temperature for many stations of the Northern Hemisphere. Author discusses the annual march of soil temperature and the methods of observation. *Subject Headings:* **Soil temperatures, Soil temperature observation, Northern Hemisphere.**

1909

2C–28 551.525

Liuboslavskiĭ, ——, **Vliianie poverkhnostnogo pokrova na temperaturu i obmen tepla v verkhnikh sloiakh pochvy.** [Influence of the surface cover upon the temperature and heat exchange of the upper layers of the soil.] *U.S.S.R., Lesnoĭ Institut, Izvestiia*, St. Petersburg, No. 18:65–150, **1909.** 25 figs. German summary. **DLC**—Investigation of the influence of variable factors of surface cover on soil temperature (snow cover, forestry, etc.). *Subject Headings:* **Soil temperatures, Cover influences.**

1910

2C–29 551.525.5(798)

Stefansson, Vilhjalmur, **Underground ice in Northern Alaska.** *American Geographical Society, Bulletin*, 42(5):337–345, May **1910.** 7 figs. **DLC**—Description of the observations made between July 1906 and February 1909 in many points of Northern Alaska. *Subject Headings:* **Frozen soil, Alaska.**

1911

2C–30 551.525:551.584

Dobson, Thos. E. W., **Temperature in cultivated and uncultivated soils.** *Royal Meteorological Society, Quarterly Journal*, 37:82–83, **1911.** table. **DLC**—The results of observations from March–

May 1910 of soil temperature at depths of 1 and 4 feet in Cockle Park for two plots (one was in cultivated soil and the other in uncultivated soil) are given. The effect on the reading at 4 feet is very slight. *Subject Headings:* **Soil temperatures, Microclimatology.**

2C–31 551.525(497.1)

*Vujevic, P., **Über die Bodentemperatur in Belgrad.** [On the soil temperature at Belgrade.] *Meteorologische Zeitschrift*, 28:289–301, **1911.** numerous tables. **DLC**—Data and discussion of temperature conditions at Belgrade. *Subject Headings:* **Soil temperatures, Belgrade, Yugoslavia.**

1912

2C–32 551.525:551.586.61(431/5)

Naegler, Wilhelm, **Die Erdbodentemperatur in ihren Beziehungen zur Entwicklung der Vegetation.** [Soil temperature in its relation to vegetation.] *Petermanns Geografische Mitteilungen*, 58(2): 253–257, **1912.** fig., 2 tables, 14 refs. **DLC**—The author analyzes soil temperature data as biological and geographical factors. The influence of solar radiation, geographical condition and other factors on soil temperature and vegetation is investigated. The characteristics of the soil temperature regime for 11 stations in Germany are outlined. *Subject Headings:* **Soil temperatures, Bioclimatology, Germany.**

2C–33 551.525:551.506.3(431/5)

*Schulze, B. and Burmester, H., **Beobachtungen über Temperaturverhältnisse der Bodenoberfläche und verschiedener Bodentiefen.** [Observations of temperature conditions of the soil surface and at various depths of soil.] *Internationale Mitteilungen für Bodenkunde*, 2:133–148, **1912. DLC**—Observations of soil temperature at the experimental agricultural station at Rosenthal near Breslau (Silesia) for 1901–1910. *Subject Headings:* **Soil temperatures, Silesia, Germany.**

1913

2C–34 551.525

Hobbs, W. H., **Soil flow.** *American Geographical Society, Bulletin*, 45(4):281–284, April **1913.** 6 refs. **DLC**—Review and discussion on the phenomena of freezing and thawing of soils, and soil flow which results from freezing and thawing. *Subject Heading:* **Soil temperatures.**

2C–35 551.525:551.586:58

Naegler, Wilhelm, **Bodentemperatur, Sonnenscheindauer und Frühlingseintritt.** [Soil temperature, duration of sunshine and beginning of spring.] *Die Umschau*, 17:192–193, **1913.** 4 refs. **DLC**—The author studies the relationship between the soil temperature at depths of $\frac{1}{2}$ and 1 m. in March and April, and at the beginning of spring. With high soil temperature at depths of $\frac{1}{2}$ and 1 m. spring comes earlier. *Subject Headings:* **Soil temperatures, Phenology.**

1915

2C–36 551.525:551.575

Bouyoucos, G. J., **Effect of temperature on movement of water vapor and capillary moisture in soils.** *Journal of Agricultural Research*, 5(4):141–172, Oct. 25, **1915.** 11 figs., 4 tables, 11 refs. **DLC**—Results of an experimental investigation are treated in detail. *Subject Headings:* **Soil temperatures, Soil moisture.**

2C–37 551.525

*Oskamp, Joseph, **Soil temperatures as influenced by cultural methods.** *Journal of Agricultural Research*, 5(4):173–180, Oct. 25, **1915.** 4 figs., 2 tables. **DLC**—Experimental investigation of variations of the soil temperature under different methods of cultivation (tillage with cover crop, straw mulch, grass land), made in southern Indiana during 1913–1915. Typical charts and tables of soil temperature for various months are given. *Subject Headings:* **Soil temperatures, Vegetative influences.**

1916

2C–38 551.525:551.508:551.501(42)

*Rambaut, Arthur A., **Underground temperature at Oxford as determined by means of five platinum resistance thermometers.** *Radcliffe Observatory, Oxford, Results of Meteorological Observations*, 51:103–204, **1916.** 4 plates, numerous tables, 11 refs. **DLC**—This fundamental investigation includes: 1) description of the apparatus and method of reducing observations of soil temperature; 2) discussion of the observations; 3) daily temperatures and mean monthly result as

deduced from platinum resistance thermometer for depths of 6½ in., 1 ft. 6 in., 3 ft. 6½ in., 5 ft. 8½ in., and 9 ft. 11½ in. during 1898–1910. *Subject Headings:* **Soil temperatures, Soil thermometers, Soil temperature observation, Oxford, England.**

1917

2C–39 551.525.5

Gilkey, H. J., **Freezing ground acts like hydraulic jack.** *Engineering News-Record*, 79(8):360–361, Aug. 23, **1917.** 2 figs. **DLC**—The heaving and settling of railroad bridge piers over city streets due to frost action is discussed. *Subject Headings:* **Frozen soil, Frost heaving, Engineering.**

1918

2C–40 551.525.5:(73)

Harrison, J. L., **First frost is never responsible for cracked concrete roadways.** *Engineering News-Record*, 80(9):418–420, Feb. **1918.** 2 figs. **DLC**—Shows conditions for freezing soils in the United States, and states the author's hypothesis that heaving can occur only as a result of more than one freezing of the subsoil. *Subject Headings:* **Frozen soil, Frost heaving, Engineering, United States.**

2C–41 551.525.5

Taber, Stephen, **Ice forming in clay soils will lift surface weights.** *Engineering News-Record*, 80(6):262–263, Feb. 7, **1918.** 2 figs. **DLC**—Observation of ice forming in sand and on the top of wet clay during cold nights. *Subject Headings:* **Soil temperatures, Frozen soil.**

2C–42 551.525.5

Wyckoff, Lewis B., **Some observations on effect of frost in raising weight.** *Engineering News-Record*, 80(13):627–628, March 28, **1918.** fig. **DLC**—Frozen ground has a laminated structure with varying thicknesses of ice and clay depending on the rate of penetration and the quantity of moisture. *Subject Headings:* **Soil temperatures, Soil moisture.**

1920

2C–43 551.525.5

Bouyoucos, G. J., **Degree of temperature to which soils can be cooled without freezing.** *Journal of Agricultural Research*, 20(4):267–269, Nov. 15, **1920.** table, 2 refs. **DLC**—The limit of supercooling without freezing of several artificial materials is given. The variations of the degree of supercooling are from −4.2°C. (sand, loam, clay) to −6.0°C. (water, carbon, agar). *Subject Heading:* **Frozen soil.**

1922

2C–44 551.525

Bouyoucos, G. J. and McCool, M. M., **A study of the causes of frost occurrence in muck soils.** *Soil Science*, 14(5):383–389, Nov. **1922.** 2 tables, 2 refs. **DLC**—Preliminary report of an investigation on the causes of frost occurrence in muck soils. The effect of soil color, difference in air temperature at various elevations above the soil surface; the specific heat, and heat of conductivity of soils on the occurrence of frost in muck soils, are discussed. *Subject Headings:* **Soil temperatures, Cover influences, Thermal conductivity.**

2C–45 551.525.5(98)

*Werenskiold, Werner, **Frozen earth in Spitzbergen.** *Geofysiske Publikasjoner*, 2(10), **1922.** 10 p. 7 figs., ref., 3 equations. **DLC**—Spitsbergen has a low mean annual temperature (about −8°C.) combined with slight snow cover. This natural condition for formation of permanent frozen soil is investigated theoretically. *Subject Headings:* **Frozen soil, Spitsbergen, Norway.**

1923

2C–46 581.525:551.586(76)

McColloch, J. M. and Hayes, W. P., **Soil temperature and its influence on white grub activities.** *Ecology*, 4(1):29–36, Jan. **1923.** 2 figs., table, 7 refs. **DLC**—Study of soil temperature at Manhattan, Kansas, made in connection with experimental work on white grub activities. The soil temperature conditions are described and the results of the investigations are discussed. *Subject Headings:* **Soil temperatures, Bioclimatology.**

1924

2C–47 551.525.2(491)

Hawkes, Leonard, **Frost action in superficial deposits, Iceland.** *Geological Magazine*, London, 61(725):509–513, Nov. **1924.** 2 figs., 8 refs. **DLC**—The characteristics of frost action in surface deposits of Iceland are a valuable indicator of paleoclimates. The description includes several types of frost and thaw action in surface deposits. *Subject Headings:* **Soil temperatures, Paleoclimatology, Iceland.**

2C–48 551.501:536.21

*Ingersoll, L. R. and Koepp, O. A., **Thermal diffusivity and conductivity of some soil materials.** *Physical Review*, 24(1):92–93, July **1924.** table, ref. **DLC**—A method for measuring thermal conductivity of soils is given. The results for quartz sand, sandy clay, calcareous earth and packed snow are listed in a table. *Subject Headings:* **Soil temperature observation, Thermal conductivity.**

1926

2C–49 551.525:551.506.3:(75;47;71)

*Highland, Scotland G., **Study of year round soil temperatures.** *American Water Works Association, Journal*, 16(3):342–354, Sept. **1926.** 3 tables, 2 refs. **DLC**—At Clarksburg, West Virginia, during 1923–1926, observations of soil temperature from zero to a depth of six feet below the surface were made. On the basis of these observations the author studied the annual march of soil temperatures. Tables with highest and lowest soil temperature data are given. The author gives a table of records of frost penetration for a period of 25 years for many states and cities of the United States and Canada. *Subject Headings:* **Soil temperatures, Frost penetration, West Virginia, United States, Canada.**

2C–50 551.525:551.586

Shaw, Charles F., **The effect of a paper mulch on soil temperature.** *Hilgardia*, Berkeley, 1(15):341–364, **1926.** 15 figs., 5 tables, 4 refs. **DLC**—Investigations with recording thermographs. The author presents many tables and photographs showing temperature records for soil and air. The effect of a paper mulch is discussed. *Subject Headings:* **Soil temperatures, Microclimatology, Bioclimatology.**

2C–51 551.525:551.501:551.584

Smith, Alfred, **A contribution to the study of interrelations between the temperature of the soil and of the atmosphere and a new type of thermometer for such study.** *Soil Science*, 22(6):447–457, Dec. **1926.** plate, 2 figs., 16 refs. **DLC**—The investigations by other authors on this subject are analyzed. For clarification of some temperature interrelations between soil and atmosphere the author made special field observations. For this purpose the air temperature at various heights above the soil surface, and the soil temperature at depths 1–6 inches were determined. The mercurial thermometer and 16 electrical resistance thermometers were used. *Subject Headings:* **Soil temperatures, Soil temperature observation, Soil thermometers, Microclimatology.**

1928

2C–52 525.525.5

Bouyoucos, G. J. and McCool, M. M., **The correct explanation for the heaving of soils, plants and pavements.** *American Society of Agronomy, Journal*, 20(5):480–491, May **1928.** 7 figs. **DLC**—The current explanation of heaving of soils, plants and pavements is given. Relations between ice formation and the variations of soil humidity are discussed. *Subject Headings:* **Frost heaving, Soil moisture, Ice formation.**

2C–53 551.525:551.525.4(71)

Harrington, E. L., **Soil temperature in Saskatchewan.** *Soil Science*, 25(3):183–195, March **1928.** 5 figs., 10 refs. **DLC**—The results of soil temperature observations during the years 1921 to 1923 inclusive, are given. The question of temperature variations at different depths is discussed. Graphs of temperature gradient showing relation between temperature, depths and times of the year are presented. The observation is made in layers from 1 to 8 ft. deep below the surface. *Subject Headings:* **Soil temperatures, Saskatchewan, Canada.**

2C–54 551.525

Kodaira, Y., **A mathematical investigation of the underground temperature observed with earth thermometers.** *Geophysical Magazine*, Tokyo, 2:107–119, **1928.** **DWB**—Theoretical analysis of the results of soil temperature observations. *Subject Heading:* **Soil temperatures.**

2C–55 551.525.5(7,5,4,47)

Nikiforoff, C., **The perpetually frozen subsoil of Siberia.** *Soil Science*, 26(1):61–82, July **1928.** 5 figs., 2 photos, table, 13 refs. **DLC**—A short description of permafrost areas in Asia, Europe, and North America; a history of investigation of this phenomenon, its thickness and temperature. Two hypotheses (climatic and glacial) as to origin of the phenomenon are discussed. *Subject Headings:* **Permafrost, Siberia, Asia, Europe, North America.**

1929

2C–56 551.525:551.521

*Keränen, J., **Wärme- und Temperaturverhältnisse der obersten Bodenschichten.** [Heat and temperature conditions of the upper layers of soil.] *Naturwissenschaftliche Monographien und Lehrbücher*, Berlin, 8:169–290, **1929.** 11 figs. (Unchecked.) Review in *Beiträge zur Geophysik*, 25:239–240, 1930. **DLC**—Daily and annual variations of heat in the upper layers of soil, influence of radiation, character of the surface cover and especially of snow cover are investigated and described. *Subject Headings:* **Soil temperatures, Radiation effects, Cover influences.**

2C–57 551.525:551.524(79)

Smith, Alfred, **Daily and seasonal air and soil temperatures at Davis, California.** *Hilgardia*, Berkeley, 4(3):77–112, May **1929.** 57 figs., 2 tables, 16 refs. **DLC**—The observational data of air and soil temperature at Davis, California, during the period 1925–1927 are given. The soil temperatures are measured at ½, 3.6, 12, 24 and 36 inch depths. The author discusses the effect of character of sky, rain and wind. Installation of resistance thermometers is described. *Subject Headings:* **Soil temperatures, Air temperature, Davis, California.**

2C–58 551.525

Smith, Alfred, **Comparison of daytime and nighttime soil and air temperatures.** *Hilgardia*, Berkeley, 4(100):241–272, Dec. **1929.** 14 figs., 12 tables, 9 refs. **DLC**—A supplementary report to that published in *Hilgardia*, 4(3):77–112, 1929 (*see item* 2C–57) discussing the relation between soil and air temperatures. *Subject Heading:* **Soil temperatures.**

2C–59 551.525.5:551.586.5

Taber, Stephen, **Frost heaving.** *Journal of Geology*, 37(5):428–461, July–Aug. **1929.** 19 figs., table, 10 refs. **DLC**—This is a laboratory investigation of problems connected with frost heaving and its applications to geology, plant physiology and engineering. *Subject Headings:* **Frost heaving, Plant ecology.**

1930

2C–60 551.525.5

Burton, V. R. and Benkelman, A. C., **The relation of certain frost phenomena to the subgrate.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 10:259–275, **1930.** 9 figs. **DLC**—Field and laboratory studies on frost action. Observational data on the relation of frost action to different soil types are given. *Subject Heading:* **Frost action.**

2C–61 551.582(73/9)

Climatic summary of the United States. *U. S. Weather Bureau, Bulletin, W*, Sec. 1 to 105, **1930.** **DWB**—Extensive climatological data for the United States. *Subject Headings:* **Climatology, United States.**

2C–62 551.525.4:551.583(71)

Johnston, W. A., **Frozen ground in the glaciated parts of northern Canada.** *Royal Society of Canada, Proceedings and Transactions*, 3rd Ser., 24(3):31–40, **1930.** 10 refs. **DLC**—The occurrence and depth of permafrost ground in Yukon, British Columbia, Mackenzie District and northern Manitoba are described. The author studies the relationship of the frozen ground to climate and glaciation. *Subject Headings:* **Frozen soil, Glaciation, Northern Canada, British Columbia.**

2C–63 551.586.61:551.525

†*Lundegårdh, Henrik, **Klima und Boden.** [Climate and soil.] Jena, **1930.** 480 p. 129 figs., 2 maps, numerous refs. **DLC**—A book which gives many details on the influence of different climatic factors and of soil temperature on the development of plants. *Subject Headings:* **Soil temperatures, Bioclimatology.**

2C–64 551.525.(431/5)

*Scultetus, H. R., **Die Beobachtungen der Erdbodentemperaturen im Beobachtungsnetze des Preussischen Meteorologischen Instituts während der Jahre 1912 bis 1927.** [Observations of soil

temperatures in the network of stations of the Prussian Meteorological Institute during 1912–1927.] *Berlin, (K.) Preussisches Meteorologisches Institut, Abhandlungen*, 9(5), **1930.** 44 p. 5 figs., 15 tables. **DLC**—Results of soil temperature observations in eastern Germany. *Subject Headings:* **Soil temperatures, Germany.**

2C–65 551.525

Taber, Stephen, **The mechanics of frost heaving.** *Journal of Geology*, 38(4):303–317, May–June **1930.** 5 figs., 4 refs. **DLC**—The laboratory investigation of the mechanics of frost heaving, made under conditions resembling field observations, indicates that soils, when subjected to freezing under normal conditions, usually behave as an open system. *Subject Headings:* **Frozen soil, Frost heaving.**

1931

2C–66 551.525.5

Benkelman, A. C. and Olmsted, F. R., **A new theory of frost heaving.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 11(1):152–165, **1931.** 7 figs., 26 refs. **DLC**—Laboratory experiments on problems of frost penetration into earth's surface during freezing weather. The authors describe numerous laboratory investigations, and present a new theory of frost heaving, based upon a fluctuating frost line. *Subject Heading:* **Frost heaving.**

2C–67 551.525.4

Burton, V. R. and Benkelman, A. C., **Frost action in silt soils defined by field cold room studies.** *Engineering News-Record*, 106(7):266–270, Feb. 12, **1931.** 7 figs. **DLC**—The practical application of research data to prevent surface heaving and frost boils is described. *Subject Headings:* **Frozen soil, Frost heaving, Frost boils.**

2C–68 551.525.5

Casagrande, A., **Discussion on frost heaving.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 11(1):168–172, **1931.** 4 figs. **DLC**—Discussion of the theory of A. C. Benkelman and F. R. Olmsted on frost heaving. (*See item* 2C–66.) *Subject Heading:* **Frost heaving.**

2C–69 551.525

Keen, B. A., **Soil temperature.** (In **The physical properties of soil.** London, **1931.** p. 295–333. 10 figs., 7 tables, 6 refs., 5 equations.) **DLC**—A discussion of the effect of the temperature of earth's interior, solar radiation, geographical conditions, wind, snow, frost, vegetative cover and nature of soil on soil temperature. The relation between soil and air temperature and characteristic of temperature waves in soil are given. *Subject Heading:* **Soil temperatures.**

2C–70 551.525.5

Taber, Stephen, **Discussion on frost heaving.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 11(1):173–177, **1931.** 3 figs. **DLC**—*Subject Heading:* **Frost heaving.**

2C–71 551.525.5

Watkins, W. I., **Discussion on frost heaving.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 11(1):165–168, **1931.** 2 figs. **DLC**—*Subject Heading:* **Frost heaving.**

1932

2C–72 551.525.5

†*Beskow, Gunnar, **Tjälbildningen och tjällyftningen.** [Soil freezing and frost heaving.] *Sveriges Geologiska Undersökning, Årsbok*, Stockholm, Ser. C. No. 375, 26(3), **1932.** 242 p. 87 figs., 28 tables, 85 refs. English summary p. 222–242. **DGS**—A short review of earlier works on soil freezing and frost heaving is given. The author treats at length the mechanics of soil freezing and the frost heaving process. Finally, the question of temperature conditions in freezing ground is discussed. An English translation by J. O. Osterberg entitled: **Soil freezing and frost heaving with special application to roads and railroads with a special supplement for the English translation of progress from 1935–1946.** Nov. 1947. Price $3.00 at Northwestern University Bookstore, Evanston, Ill. **DGS**—*Subject Headings:* **Frozen soil, Frost heaving.**

2C–73 551.525

Keen, B. A., **Soil physics in relation to meteorology.** *Royal Meteorological Society, Quarterly Journal*, 58(245):229–250, July **1932.** 15 figs., 11 refs. **DLC**—The physical aspects of the problem dealing with the transmission of heat in a porous or granular moist material are considered. *Subject Headings:* **Soil temperatures, Soil moisture, Weather conditions.**

2C–74 551.525(79)

Smith, Alfred, **Seasonal subsoil temperature variations.** *Journal of Agricultural Research*, 44(5):421–428, March 1, **1932.** 3 figs., table, 20 refs. **DLC**—This paper is the result of soil temperature observations at Davis, California, during 1930. Temperatures were determined by electrical resistance thermometers at depths from 6 inches to 12 feet. The seasonal soil temperatures, root growth and interpretation of temperature data are studied. *Subject Headings:* **Soil temperatures, California.**

2C–75 551.525(94)

West, E. S., **The effect of soil mulch on soil temperature.** *Australia, Council for Scientific and Industrial Research, Journal*, 5:236–246, 1932. **DWB**—*Subject Headings:* **Soil temperatures, Cover influences.**

2C–76 551.525(52)

*Yakuwa, R., **Über die Bodentemperaturen in den verschiedenen Bodenarten.** [On temperatures of various types of soil.] *Geophysical Magazine*, Tokyo, 6:179–187, **1932.** numerous tables. **DWB**—Hourly observations were made during the summer at various depths and in different types of soil. The thermal conductivity was computed. *Subject Headings:* **Soil temperatures, Thermal conductivity, Japan.**

1933

2C–77 551.525

*Siegenthaler, Jakob, **Bodentemperaturen in Abhängigkeit von äusseren meteorologischen Faktoren.** [Dependence of soil temperatures upon external meteorological factors.] *Beiträge zur Geophysik*, 40(15):305–332, **1933.** 3 figs., 14 tables, 8 refs. **DLC**—Author gives the correlation coefficients between soil temperature and air temperature, sunshine hours, cloudiness and precipitation. *Subject Headings:* **Soil temperatures, Weather conditions.**

2C–78 551.525(4)

Wright, H. L., **The variation of soil temperature below turf: a discussion of observations at Kew Observatory.** *Royal Meteorological Society, Memoirs*, 4(31):1–18, **1933.** **DLC**—Comparison of soil temperature measurements at depths of 10 and 20 cm. in Potsdam (sand) and Kew (turf). *Subject Headings:* **Soil temperatures, Cover influences, Thermal conductivity, Kew, England, Potsdam, Germany.**

1934

2C–79 551.578.46(74)

Horton, R. E. and Leach, H. A., **Snow-surface temperature.** *Monthly Weather Review*, 62:128–130, April **1934.** 2 figs., ref. **DLC**—Determination of temperature of snow surface, according to observations at Horton Hydrologic Laboratory, Voorheesville, N. Y., is made, and a formula for the computation of mean daily snow surface temperatures is suggested. *Subject Heading:* **Snow surface temperatures.**

1935

2C–80 551.525

Geslin, H., **La température du sol.** [Soil temperature.] *La Météorologie*, 3rd Ser., **1935.** p. 5–25. **DWB**—Mechanical and chemical effect. General laws of temperature distribution. *Subject Heading:* **Thermal gradient.**

2C–81 551.525(62)

Meinardus, W., **Bodentemperaturen in der Wüste bei Schelall, Oberägypten.** [Soil temperature at the desert near Schelall, Upper Egypt.] *Gesellschaft der Wissenschaften zu Göttingen, Nachrichten, Math.-Physik., Neue Folge*, 1:1–18, **1935.** **DLC**—The author analyzes the soil temperature condition for sandy ground. The thermal conductivity of sandy ground is determined. *Subject Headings:* **Soil temperatures, Thermal conductivity, Egypt.**

1936

2C–82 551.525.5

Frost penetration studies at Portland, Maine. *Engineering News-Record*, 116(15):537, April 9, **1936.** **DLC**—A study to find some method of guiding waterworks operators in anticipating freezing conditions. *Subject Headings:* **Frost penetration, Maine.**

2C–83 551.525.5(7)

Fuller, Harry U., **Frost penetration as effected by weather and snow conditions.** *New England Water Works Association, Journal*, 50(3):299–301, Sept. **1936. DLC**—The author describes normal winter soil temperature in North America, and the soil temperatures during a number of years which have been remarkable for very cold winters (1903, 1917, 1918, 1933 and 1934). *Subject Headings:* **Frost penetration, Soil temperatures, Snow cover, North America.**

2C–84 551.525:551.524(78)

Mail, G. A., **Soil temperatures at Bozeman, Montana during subzero weather.** *Science*, 83(2163):574, June 12, **1936.** fig. **DLC**—The air and soil temperatures at depths of 3 and 6 feet during February 1936 are given. This month was the coldest in 53 years. *Subject Headings:* **Soil temperatures, Air temperature, Montana.**

2C–85 551.525

Scaëtta, M., **Contribution à l'étude des climats des sols tropicaux.** [Contribution to a study of climate of tropical soils.] *La Météorologie*, 3rd Ser., **1936.** p. 531–546. **DWB**—Soil temperature measurements at various depths from surface to 1 cm. below surface. A general statement on the study of soil climate. *Subject Headings:* **Soil temperatures, Soil climatology, Tropical regions.**

1937

2C–86 551.525:551.575.5

Becker, F., **Die Erdbodentemperatur als Indikator der Versickerung.** [Soil temperature as an indicator of percolation.] *Meteorologische Zeitschrift*, 54:372, **1937. DLC**—A short study on the relation between soil temperature and percolation at various depths. *Subject Headings:* **Soil temperatures, Soil moisture, Percolation.**

2C–87 551.525.5

Fomin, N. P. and Khrgian, A. Kh., **Vosproizvedenie vechnoĭ merzloty v laboratorii.** [Permafrost in the laboratory.] *Meteorologiia i Gidrologiia*, No. 1:27–38, **1937.** 6 figs., 4 tables, 5 refs., equations. German summary p. 38. **DLC**—For the investigation of frozen ground and the problems attending it, permafrost conditions were provided in a laboratory. Description of installations and some results of measurements are given in this article. *Subject Heading:* **Permafrost.**

2C–88 551.525

Khrgian, A. Kh., **Temperatura pochvy i klimat.** [Soil temperature and climate.] *Meteorologiia i Gidrologiia*, No. 7:18–28, **1937.** 2 figs., 4 tables, 2 refs. **DLC**—Author shows that the soil temperature reflects the different climatic characteristics: air temperature, wind, snow cover and precipitation. Their influence could be expressed, approximately, in figures. *Subject Headings:* **Soil temperatures, Meteorological elements.**

2C–89 551.525:551.508

Kedrolivanskiĭ, V. N., **Izmerenie temperatury pochvy.** [Measurement of soil temperature.] (In **Meteorologicheskie pribory.** [Meteorological instruments.] Moscow, SSSR Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, **1937.**)—One chapter (containing 7 figs. p. 125–137) deals with the measurement of soil temperature.—*Subject Headings:* **Soil temperatures, Soil thermometers, Soil temperature observation.**

2C–90 551.525.5

Königsberger, J. G., **Geothermische Messungen in Bergwerken und Übersicht über die Ergebnisse der Geothermik.** [Geothermal observations in mines and a short review of the results of geothermics.] *Beiträge zur Geophysik*, 7:68–83, **1937.** 34 refs. English summary p. 68–71. **DLC**—Geothermal observations in mines since 1910. The author gives the thermal conductivity of soil. *Subject Headings:* **Soil temperatures, Thermal conductivity, Mine temperatures.**

2C–91 551.525

*Smirnov, A. A., **Teplovoĭ balans pochvy v iasnuiu i pasmurnuiu pogodu.** [Thermal balance of the soil in clear and overcast weather.] *Meteorologiia i Gidrologiia*, 7:68–76, **1937.** 14 tables. **DLC**—The temperature balance between the soil covered by plants and the bare ground is investigated and it is found that the difference between them is smaller in cloudy weather. *Subject Headings:* **Soil temperatures, Heat exchange.**

1938

2C–92 551.525.4(548.7)

Andrews, J. P., **Thermal diffusivity of the soil at Colombo Observatory.** *London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, 7 Ser., 25(172):1066–1073, June **1938.** 2 figs., 4 tables, 3 refs. **DLC**—The monthly means of underground temperatures at Colombo Observatory, derived from daily observations during 1919–1933, were analyzed. It was found that the thermal diffusivity of the soil has a value of about 0.009 c.g.s. units. *Subject Headings:* **Soil temperatures, Thermal gradient, Thermal conductivity, Colombo, Ceylon.**

2C–93 551.525.2

Bilham, E. G., **Frequency of ground frosts; effect of the hour of observation.** *Meteorological Magazine, London*, 73(874):308, Dec. **1938. DLC**—At certain stations the grass minimum thermometer was read at 7 h. and again at 9 h. or 10 h. From these records it is possible to determine how many ground frosts are in fact "missed" by the adoption of 7 h. as the time of reading at synoptic stations. *Subject Heading:* **Soil surface temperatures.**

2C–94 551.525.5:551.583.3

Bykov, G. E., **On the question of climates during the Quaternary period of the Far East and on the history of permanently frozen grounds.** *Akademiia Nauk, SSSR, Doklady*, 20(5):387–390, **1938.** 4 refs. In English. **DLC**—Important investigation. On the basis of pollen analysis, it was discovered that ice soils are not a relic of glacial time, but are a new formation. *Subject Headings:* **Frozen soil, Climatic changes, Pollen analysis.**

2C–95 551.525.2(73/9)

Champion, Donald L., **Night radiation in the spring of 1938.** *Meteorological Magazine, London*, 73(874):302–303, Dec. **1938.** fig. **DLC**—Night radiation observations from March to May 1938 at Goff's Oak, Hertfordshire are discussed. *Subject Headings:* **Soil surface temperatures, Great Britain.**

2C–96 551.525.(479)

Chasovnikov, G. N., **Temperatura pochvy.** [Soil temperature.] (In **Klimat Rostovskoĭ oblasti i Krasnodarskogo Kraia**, V. N. Tervinskiĭ (ed.), Rostov-on-Don, **1938.** p. 53–57, 113–115. 7 tables, 6 refs.) **DWB**—Description of soil temperature conditions in the Rostov and Krasnodar regions. Mean and average soil temperature from the surface to a depth of 1 m., and the frost penetration in soil for some stations are given. *Subject Headings:* **Soil temperatures, North Caucasus, U.S.S.R.**

2C–97 551.525:551.506.3(5)

†*Egypt. Ministry of Public Works, Physical Dept., **Climatological normals for Egypt and the Sudan, Cyprus and Palestine.** Cairo, **1938.** 148 p. 8 figs., 2 maps, numerous tables and refs. **DLC**—A complete consolidation of the mean data derived from a long series of observations is presented. Table on page 131 gives soil temperature at 60 and 100 cm. depths, and for the surface. A list of publications and references to articles relating to the meteorology of Egypt and the Sudan is given. *Subject Headings:* **Soil temperatures, Soil temperature data, Egypt, Sudan, Cyprus, Palestine.**

2C–98 551.501:551.525

Gil'gner, IU., **Mozhno li primeniat' metallicheskie trubki dlia pochvennykh termometrov?** [Is it possible to use metallic tubes for soil thermometers?] *Meteorologiia i Gidrologiia*, No. 7:149–150, July, **1938.** fig., 2 refs. **DLC**—Research by the author shows that the application of metal tubes for measurement of soil temperature at depths of less than 1.6 m. is inadmissible. *Subject Heading:* **Soil temperature observation.**

2C–99 551.525.2:551.579

Leroux, Désiré, **Influence du temps et des variations de température sur la teneur des sols agricoles en principes fertilisants solubles dans l'eau.** [The influence of weather and temperature variations on the retention of water soluble fertilizers by farm soils.] *Académie des Sciences, Paris, Comptes Rendus*, 207(11):504–506, Sept. 19, **1938.** table, 2 refs. **DLC**—Results of an experiment made with 4 different kinds of soil, with humidity from 20 to 100%. *Subject Headings:* **Soil surface temperatures, Soil moisture.**

2C–100 551.525.5:551.579:69(47)

Lukashev, K. I., **Oblast' vechnoĭ merzloty kak osobaia fiziko-geograficheskaia i stroitel'naia oblast'.** [Permafrost region as a specific physico-geographical and construction area.] Leningrad,

Izdat. Leningradskogo Universiteta, **1938.** 187 p. 61 figs., 34 tables, 142 refs. **DLC**—The author gives the characteristics of climatic and hydrological conditions in a permafrost area. Soil types in this area are described and the difficulty of construction is analyzed. *Subject Headings:* **Frozen soil, Permafrost, Construction, U.S.S.R.**

2C–101 551.525.5:551.501.1(02)

Obruchev, V. A., (ed.), **Sbornik instruktsiĭ in programmnikh ukazaniĭ po izucheniiu merzlykh gruntov i vechnoĭ merzloty.** [Manual of instructions and outline of a program for the investigation of frozen soil and permafrost.] Moscow, Izdat. Akademii Nauk, SSSR, **1938.** 272 p. 64 figs., 25 tables, 84 refs. **DLC**—Descriptions of many instruments are given. *Subject Headings:* **Instructions for observers, Symposia, U.S.S.R.**

2C–102 551.525.5(47)

Sakharov, M. I., **Promerzanie i razmerzanie pochvy v lesnykh fitotsenozakh.** [Freezing and thawing of soil in wood phytocenoses.] *Meteorologiia i Gidrologiia*, No. 11–12:136–148, Nov.–Dec. **1938.** 16 tables, 20 refs. **DLC**—A description of investigations on freezing of soil in Kazan forests made during 1927–1931. The observational data for the winter seasons of 1926/27 and 1927/28 are given. The influence of snow and grass cover on soil temperature was analyzed. *Subject Headings:* **Soil temperatures, Soil freezing, Vegetative influences, Snow cover, Forestry, Kazan, U.S.S.R.**

2C–103 551.525:(47)

Shul'gin, A., **Minimum temperatury pochvy na glubine 3 sm. v osennezimniĭ period.** [Minimum soil temperatures at a depth of 3 cm. in the autumn-winter period.] *Meteorologiia i Gidrologiia*, No. 2:127–134, **1938.** 8 figs., 7 tables. **DLC**—Observations from 11 meteorological stations of the Dnepropetrovsk area during 1934–1937. The warming influence of the snow cover and the temperature variations to a depth of 3 cm. are favorable for the wintering of winter seeds. *Subject Headings:* **Soil temperatures, Snow cover influence, Dnepropetrovsk Area, U.S.S.R.**

2C–104 551.525.4

Smith, W. O. and Byers, H. G., **The thermal conductivity of dry soils of certain of the great soil groups.** *Soil Science Society of America, Proceedings*, 3:13–19, **1938.** **DA**—*Subject Heading:* **Thermal conductivity.**

1939

2C–105 551.508.29:551.525

Goodell, B. C., **Soil boring tool for frost depth determination.** *Journal of Forestry*, 37(6):457–459, June **1939.** 2 figs., 3 refs. **DLC**—The author describes a tool for measurement of soil freezing. Methods of observation with this instrument are also treated. *Subject Heading:* **Soil temperature observation.**

2C–106 551.525(9)

Ravet, J., **La température du sol à Tahiti.** [Soil temperature on Tahiti.] *Annales de Physique du Globe de la France d'Outre-mer*, 6(35):134–135, **1939.** 5 figs. **DLC**—*Subject Headings:* **Soil temperatures, Tahiti.**

1940

2C–107 551.525

†*Albrecht, Fritz, **Untersuchungen über Wärmehaushalt der Erdoberfläche in verschiedenen Klimagebieten.** [Investigations on the heat economy of the earth's surface in different climatic regions.] *Germany, Reichsamt für Wetterdienst, Wissenschaftliche Abhandlungen*, 8(2), Berlin, **1940.** 80+p. 39 figs., 17 tables, 70 refs. **DLC**—(*Same item* as No. 8–66 in Aug. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Energy exchange, Albedo, Oceans, Continents.**—*M.R.*

2C–108 551.525(77)

*Atkinson, H. B. and Bay, Clyde E., **Some factors affecting frost-penetration.** *American Geophysical Union, Transactions*, Vol. 21, Pt. 3:935–948, **1940.** 11 figs., 8 tables, 3 refs. **DLC**—Observations in winter from 1935–1940 at La Crosse, Wisconsin, for determining the penetration of frost under different farming practices, exposures and cover conditions. Good data on relation between soil temperature and snow cover and exposure. *Subject Headings:* **Soil temperatures, Frost penetration, Vegetative influences, Wisconsin.**

2C–109 551.525.5

Pratt, Frank R., **Depth of frost under pavement.** *Engineering News-Record*, 125(25):835, Dec. 19, **1940.** 2 figs., table. **DLC**—The measurement of the depth of frozen soil under the pave-

ment in front of the Physics Building of the New Jersey College for Women at New Brunswick. Observed temperatures and temperature gradients are given. *Subject Headings:* **Frozen soil, Cover influences, Thermal gradient.**

2C–110 551.525.5:67

Sumgin, M. I. and Demchinskiĭ, B., **Oblast' vechnoĭ merzloty.** [The region of permafrost.] Leningrad, Izdat. Glavsevmorputi, SSSR, **1940.** 237 p. 64 figs., tables, 61 refs. **DLC**—A non-technical work on the geographical aspects of frozen soil. Especial emphasis is placed on the problems of agriculture, mining, housing, transportation, etc., in the Arctic regions of European and Asiatic U.S.S.R. The warming in the Arctic during the last half century, as reflected in the degradation of the permafrost area, is also treated extensively. Changes in soil temperature also give indication of the "warming." (*Same item* as No. 10–102 in Oct. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Permafrost, Agricultural climatology, U.S.S.R.**—*M.R.*

2C–111 551.525.5(02)

†*Sumgin, M. I., Kachurin, S. P., et al., **Obshchee merzlotovedenie.** [General course in permafrost science.] Moscow, Izdat. Akademii Nauk, SSSR, **1940.** 339 p. 110 figs., 60 tables, 252 refs., numerous equations. **DLC**—A technical work for university students covering all phases of permafrost investigations: mechanical and physical processes of freezing and thawing, climatological and seasonal aspects, variations in soil temperatures (including considerable data for the Soviet Arctic), secular changes in boundary of permafrost area (in Asia and America) and applications to agriculture, engineering and other economic activities. In addition to a great deal of tabular data there are many graphs showing variations in time and space in soil temperature or permafrost, and many interesting illustrative photographs of equipment or research work. History, development and methods of investigation are also treated. (*Same item* as No. 10–103 in Oct. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Permafrost, Soil temperatures, Textbooks, U.S.S.R.**—*M.R.*

2C–112 551.525:551.508

U.S.S.R. Glavnaia Geofizicheskaia Observatoriia, **Temperatura pochvy.** [Soil temperature.] (In **Rukovodstvo meteorologicheskim stantsiiam 2 razriada.** [Instruction for meteorological stations of 2nd class.] Moscow, Gidromet. Izdat., **1940.** 2 figs., table.)—The description of various instruments (Savinov's, Shukevich's, Lamon's thermometers, etc.) for observation of surface and soil temperatures. Methods of observations are given. *Subject Headings:* **Soil temperatures, Soil temperature observation.**

1941

2C–113 551.525.5

Belotelkin, K. T., **Soil-freezing and forest-cover.** *American Geophysical Union, Transactions,* Vol. 22, Pt. 1:173–175, **1941.** fig. **DLC**—Interrelation between the depth of soil's freezing, the speed of thawing, snow cover and the natural soil drainage. *Subject Headings:* **Soil temperatures, Soil freezing, Soil moisture, Snow cover.**

2C–114 551.525:551.526.6(988)

Church, J. E., **Temperature of Arctic soil and water.** *Michigan University Studies, Scientific Series,* 6(2):46–59, **1941.** 2 figs., 11 tables, 4 refs. **DLC**—Results of observations made by the Greenland Expedition of the University of Michigan; mainly water temperature, some data for soil temperature. *Subject Headings:* **Soil temperatures, Sea temperatures, Greenland.**

2C–115 551.525.5(439.1)

Fábiánics, Ferenc, **A 0° alatti hömérséklet a talajban. Die Bodentemperatur unter Null in Budapest.** [Soil temperature below zero in Budapest.] *Időjárás,* 45:141–147, **1941.** 5 figs., 1 table, 3 refs. German summary p. 176–177. **DWB**—Results of observations on seasonal freezing of soil. *Subject Headings:* **Soil temperatures, Soil freezing, Budapest, Hungary.**

2C–116 551.525.2:551.551

Sakadi, Z., **Disturbance of flow of air by heat conduction from the ground.** *Physico-mathematical Society, Japan, Proceedings,* 23:214–226, March **1941.** **DWB**—A mathematical analysis to find the effect of variation in ground temperature on flow of air relative to its surface. *Subject Headings:* **Soil temperatures, Air temperature, Heat exchange.**

2C–117 521.525(79)

Spicer, H. Cecil, **Geothermal gradient at Grass Valley, California. A revision with a note on the flow of heat.** *Washington Academy of Sciences, Journal,* 31(12):495–501, Dec. **1941.** fig., 3 tables, 12 refs. **DLC**—The primary results and revision of W. D. JOHNSTON'S computing. The

author gives tables for temperature gradient and depth–temperature relation and experimentally determined values of thermal conductivity. *Subject Headings:* **Soil temperatures, Thermal gradient, Grass Valley, California.**

2C–118 551.5(02):551.506

*†U. S. Dept. of Agriculture, **Climate and Man.** *Yearbook of Agriculture 1941.* Pt. 5. **Climatic data, with special reference to agriculture in the United States.** p. 664–1210, 1941. **MH-BH**—On p. 480 the effect of forests on soil temperature is treated. A figure shows the average soil temperatures at 6″ depth outside and inside a forest. *Subject Headings:* **Agricultural climatology, Observational data.**

2C–119 521.525

Whitson, Andrew Robeson, **Notes on climate and soil.** Madison, Wisconsin, University of Wisconsin, 1941. 246 p. numerous figs. and tables. **DLC**—On p. 229 the author shows that freezing and thawing of soil are factors of much importance in erosion. *Subject Headings:* **Soil temperatures, Soil erosion.**

1942

2C–120 551.525:551.579

Anderson, Alfred B. C., Fletcher, Joel E. and Edlefsen, Niels E., **Soil-moisture conditions and phenomena in frozen soils.** *American Geophysical Union, Transactions,* Vol. 23, Pt. 2:356–364, 1942. 3 figs., tables, 7 refs., 22 equations. **DLC**—The experimental methods of measuring the temperature at which soil moisture freezes are discussed. Interrelations among the thermodynamic variables under different condition of freezing soil moisture, Clausius-Clapeyron equation and movement of soil moisture in relation to freezing phenomena in soils, are investigated. *Subject Headings:* **Freezing soil, Soil moisture.**

2C–121 551.525.5

Kreutz, Wilhelm, **Das Eindringen des Frostes in Böden unter gleichen und verschiedenen Witterungsbedingungen während des sehr kalten Winters 1939/1940.** [Penetration of frost into the ground under similar and different weather conditions during the very cold winter 1939/1940.] *Germany, Reichsamt für Wetterdienst, Wissenschafltiche Abhandlungen,* 9(2), 1942. 22 p. **MH-BH**—*Subject Headings:* **Soil temperatures, Soil freezing.**

2C–122 551.525.5(7)

Sharp, Robert P., **Ground-ice mounds in tundra.** *Geographical Review,* 32(3):417–423, July 1942. 6 figs., 20 refs. **DLC**—A review of the investigation of the Wood Yukon Expedition in the Wolf Creek area in 1941. The mounds of the Wolf Creek area are described. The cycle of mound development and relation to tundra forms is analyzed. *Subject Headings:* **Soil freezing, Wolf Creek, Yukon Territory.**

2C–123 551.525

*Smith, W. O., **The thermal conductivity of dry soil.** *Soil Science,* 53(6):435–459, June 1942. 6 figs., 8 tables, 10 refs., 19 equations. **DLC**—Many studies on the question of thermal conductivity of soil are summarized. Methods for cutting large monolith samples for the calculation of the thermal conductivity of soil are given. *Subject Heading:* **Thermal conductivity.**

2C–124 551.525(439.1)

*Sulyok, Zoltán, **Budapest talajhömérséklete. Die Bodentemperatur in Budapest.** [Soil temperature in Budapest.] *Időjárás,* 46:15–25, 1942. 5 figs., 2 tables, 2 refs. German summary p. 50–52. **DWB**—Report on the soil temperature conditions at Budapest. *Subject Headings:* **Soil temperatures, Budapest, Hungary.**

1943

2C–125 551.525

Arndt, W. J., **Temperature changes and duration of high and low temperatures in a concrete pavement.** *National Research Council, Highway Research Board, Proceedings,* Washington, D. C., 23:273–279, 1943. **DLC**—Some characteristics of soil temperature variation caused by concrete pavements. *Subject Headings:* **Surface temperatures, Cover influences.**

2C–126 551.525.5:551.509.3

Berggren, W. P., **Prediction of temperature-distribution in frozen soils.** *American Geophysical Union, Transactions,* Vol. 24, Pt. 3:71–77, 1943. 2 figs., 4 tables, 13 refs., 19 equations. **DLC**—The prediction of thermal conditions in soils is limited by the reliability of forecasting the surface temperature, and of the determination of initial temperature profiles with depth. The chief complications of the analysis result from inadequate knowledge of soil thermal properties and their variations with moisture content. *Subject Headings:* **Soil temperatures, Frozen soil.**—*M.R.*

2C–127 551.525(798)

Burrill, Meredith F., **Soil-temperature in the Matanuska Valley of Alaska: observations of 1941.** *American Geophysical Union, Transactions*, Vol. 24, Pt. 1:151–153, **1943.** fig., 3 tables. **DLC**—Reports on the observation made between July 3 and September 10, 1941 at depths of from 3 to 36 inches under young oat crop and birch-spruce forest. *Subject Headings:* **Soil temperatures, Vegetative influences, Alaska.**

2C–128 551.525:551.525.2

Daubenmire, R. F., **Temperature gradients near the soil surface with reference to techniques of measurement in forest ecology.** *Journal of Forestry*, 41(8):601–603, **1943.** 2 figs. **DLC**—Observations with thermoelement at the soil surface, 5 mm. below it, 5 and 10 mm. above it indicate that the error in determining temperature of exposed surface of soil with ordinary thermometers may be very considerable. *Subject Headings:* **Soil temperatures, Surface temperatures, Heat exchange.**

2C–129 551.525.4(436)

Geilhofer, F., **Ergebnisse und Erkenntnisse der Bodentemperaturmessungen.** [Result obtained from an investigation of soil temperatures.] *Gas- und Wasserfach*, 86:236–243, **1943.** 3 figs. **DA**—Results of a study by the Vienna Waterworks at 4 stations, Dec. 1940–Feb. 1942. Curves show air and soil temperatures, and comparison is made between the different stations. Temperatures at various depths (down to 3 m.). Effect of changes of air temperature and the retarding influences of depths are discussed. *Subject Headings:* **Soil temperatures, Air temperature, Vienna, Austria.**

2C–130 551.525.4(76)

Hide, J. C., **A graphic presentation of temperatures in the surface foot of soil in comparison with air temperatures.** *Soil Science Society of America, Proceedings*, Vol. 7:31–35, **1943.** numerous graphs. **DLC**—Soil temperature observations at Manhattan, Kansas at depths of 0, 2, 6 and 12 inches. The discussion deals with data for 3 selected periods (rapidly falling temperatures, rapidly rising temperatures, and clear, hot summer weather). *Subject Headings:* **Soil temperatures, Manhattan, Kansas.**

2C–131 551.525.4

Korytnikova, N. N., **O sviazi glubinnykh temperatur s termicheskimi koeffitsientami gornykh porod i formoĭ glubinnykh struktur.** [On the relation of depth temperatures with thermic coefficients of rocks and the form of depth structure.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 7(3):115–133, **1943.** 17 figs., 2 tables, 9 refs., 17 equations. English summary p. 133. **DLC**—Thermal anomalies in the earth's crust, caused by bodies of different thermal conductivity, are examined with the aid of formulas for the distribution of temperature in horizontal and inclined strata. *Subject Headings:* **Soil temperatures, Thermal gradient, Thermal conductivity.**

2C–132 551.525.6:551.501(47)

Kraskovskiĭ, S. A., **Izmerenie temperatury v solianykh shakhtakh.** [Measurement of temperature in salt mines.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 7(3):134–142, **1943.** 4 figs., 5 tables, 6 refs., 3 equations. English summary p. 142. **DLC**—Results of the author's experiments made in the autumn of 1940. Study on the methods of observation. *Subject Headings:* **Mine temperatures, Soil temperature observation, U.S.S.R.**

2C–133 551.525:551.573:551.579

Lamb, J., Jr. and Chapman, J. E., **Effect of surface stones on erosion, evaporation, soil temperature, and soil moisture.** *American Society of Agronomy, Journal*, 35(7):567–578, July **1943.** 5 figs., 5 tables, 8 refs. **DLC**—The soil temperatures were usually higher at the 1-inch depth under the stones than under the fallow at the same depth. The fallow temperatures were 14° to 24.5°F. higher at the 1-inch depth than under the straw. *Subject Headings:* **Soil temperatures, Evaporation, Soil moisture, Cover influences.**

2C–134 551.525.2:63(42)

Penman, H. L., **Daily and seasonal changes in the surface temperature of fallow soil at Rothamsted.** *Royal Meteorological Society, Quarterly Journal*, 69:1–16, Jan. **1943.** 6 figs., table, 11 refs. **DLC**—A method of obtaining continuous records of soil surface temperature is described. The relation between surface and sub-surface is briefly considered, and then the interdependence of soil and air temperatures is examined. The effect of the diurnal oscillation of surface temperature on germinating seed is discussed. *Subject Headings:* **Soil temperatures, Rothamsted, England.**—*M.R.*

2C–135 551.525.5:551.579.5(77)

Post, F. A. and Dreibelbis, F. R., **Some influences of frost penetration and microclimate on the water relationships of woodland, pasture, and cultivated soils.** *Soil Science Society of America, Proceedings*, 7:95–104, 1942 (1943). **DLC**—During 3 successive winters, studies were made in east central Ohio of the frost depth, snow depth, soil moisture and temperature differences recorded at close intervals in and near the soil surface. Measurements were made on a variety of slopes, aspects, and vegetative cover common to the area. *Subject Headings:* **Soil temperatures, Agricultural climatology, Ohio.**

2C–136 551.525.2(73/9)

*Russell, Richard Joel, **Freeze-and-thaw frequencies in the United States.** *American Geophysical Union, Transactions*, Vol. 24, Pt. 1:125–133, **1943.** 7 tables, map. **DLC**—The accompanying map shows the distribution of effective freeze-and-thaw alternation per year over the United States. It is based upon observation of maximum and minimum temperature made by cooperative observers of the U. S. Weather Bureau at 863 stations during 18 years (1914–1931). *Subject Headings:* **Soil temperatures, United States.**—*M.R.*

2C–137 551.525.5:551.583.3:551.582.1(798)

†*Taber, Stephen, **Perennially frozen ground in Alaska: its origin and history.** *Geological Society of America, Bulletin*, 54:1433–1548, Oct. 1, **1943.** 13 figs., 5 tables, 119 refs. **DLC**—This is an investigation of the geologic history of Alaska since late Tertiary time. Maps of perennially frozen ground in Alaska, climatological data for the present climate and the depth of ground ice at the present time are included. *Subject Headings:* **Permafrost, Climatalogical data, Paleoclimatology, Alaska.**

2C–138 551.525:551.521.1(45)

*Zonon, F. S., **Sabbia e radiazione al Lido di Venezia.** [Sand and radiation at the Lido, Venice.] *Geofisica Pura e Applicata*, 4(4):152–170, **1943.** 3 figs., 3 tables, 4 refs. Italian and German summaries p. 152. **DLC**—Observations of the temperature of the sand at the Lido, Venice, for the period 1929–1941 are discussed and compared with solar radiation measurements for the same period. *Subject Headings:* **Soil temperatures, Solar radiation, Venice, Italy.**

1944

2C–139 551.524.3:551.525.2(79)

*Bliss, Donald E., **Air and soil temperatures in a California citrus orchard.** *Soil Science*, 58(4):259–274, Oct. **1944.** 4 figs., 4 tables, 9 refs. **DLC**—Wide variations in the range of daily temperature fluctuations in the air and in the soil near the surface were associated with different meteorological conditions. The relation of air and soil temperatures at Anaheim (the cool coastal climate) and at Indio (the inland climate) discussed. *Subject Headings:* **Surface temperatures, Air temperature, California.**

2C–140 551.525.4

Dobrowsky, Alfred, **Über eine modelmässige Darstellung des Eindringens der periodischen Temperaturschwankungen in den Erdboden.** [On a model for presenting the penetration of periodic oscillations of temperature into ground.] *Meteorologische Zeitschrift*, 61(1):91–97, Jan. **1944.** 8 figs., 5 refs., 15 equations. **DWB**—The mathematical investigation of thermal conductivity of soil and the periodic oscillations of temperature near and below soil surface. This study was made on the basis of meteorological data in Munich and of laboratory observations. *Subject Headings:* **Soil temperatures, Thermal gradient, Munich, Germany.**

2C–141 551.525.6

Esclangon, Ernest, **Sur les variations séculaires de la température des caves de l'Observatoire de Paris, et leur relation éventuelle avec celles de la chaleur interne des couches terrestres.** [Secular temperature variations in the caves of the Paris Observatory and their eventual relation to internal heat variations of the ground layers.] *Académie des Sciences, Paris, Comptes Rendus*, 218(26):981–984, June 26, **1944.** **DLC**—Author gives the characteristics of thermometers used for the measurements. First measurements were made in 1671 by MARRIOT. Author found out that temperatures for the period 1922–1943 = 12.9°C. were 1.2°C. higher than those observed at the end of the 17th and the beginning of the 18th century. *Subject Headings:* **Earth temperatures, Soil thermometers.**

2C–142 551.525(431/5)

Steeger, Albert, **Diluviale Bodenfrosterscheinungen am Niederrhein.** [Diluvial soil frost phenomena in the lower Rhine.] *Geologische Rundschau*, 34(7–8):520–538, Sept. 10, **1944.** 14 figs., 25 refs. **DLC**—A review of work done in this area. *Subject Headings:* **Earth temperatures, Rhine Region, Germany.**

2C–143 551.525.5:551.58

†*Troll, Carl, **Strukturboden, Solifluktion und Frostklimate der Erde.** [Structure of the soil, salt fluctuation and the frost climates of the earth.] *Geologische Rundschau*, 34(7–8):545–694, Sept. 10, **1944.** 72 figs., 583 refs. **DLC**—Description of the soil structure and its characteristics in different zones of the globe. Investigation of climatic influence on soil forming processes. Experimental study of freezing of soil and the extension of permafrost. Numerous references on soil temperature and permafrost. *Subject Headings:* **Frozen soil, Climatic influences, Climatology.**

1945

2C–144 551.525.4:551.525.5(57)(47)

*Efimov, A. L., Mel'nikov, P. L. and Solov'ev, P. A., **Podmerzlotnye vody raĭona IAkutska.** [Water under the permafrost layer in the Yakutsk region.] Akademiia Nauk SSSR, Otdel. Geologo-Geographicheskikh Nauk, Referaty nauchno-issledovatel'skikh rabot za 1944 g., Moscow, **1945.** p. 130. **DLC**—Review of special investigations in the Yakutsk region during 1938–1944. The measurement of the earth's temperature at depths to 500 m. is given. In this area the under layer of permafrost occurred at a depth of 204 m. *Subject Headings:* **Earth temperatures, Permafrost, Thermal gradient, Yakutsk Region, Siberia, U.S.S.R.**

2C–145 551.525.5

Gardner, R., **Some effects of freezing and thawing on the aggregation and permeability of dispersed soils.** *Soil Science*, 60(6):437–443, Dec. **1945.** 2 figs., 2 tables. **DLC**—Experimental investigation. *Subject Heading:* **Freezing soil effects.**

2C–146 551.525

Swanberg, J. H., **Temperature variation in a concrete pavement and the underlying subgrade.** *National Research Council, Highway Research Board, Proceedings*, Washington, D. C., 25:169–180, **1945.** 12 figs., 3 tables. **DLC**—Temperature variations in a northern climate from November 1940 through October 1945 are given for the temperature above and in the 7-inch concrete slab. *Subject Headings:* **Soil temperatures, Cover influences.**

1946

2C–147 551.525.5:551.579.5:551.573

Anderson, Henry W., **The effect of freezing on soil moisture and on evaporation from a bare soil.** *American Geophysical Union, Transactions*, 27(6):863–870, Dec. **1946.** 2 tables, 8 refs., 9 equations. **MH-BH**—The author studies the effect of soil freezing on the moisture distribution in the profile of a soil kept bare of vegetation. A comparison of evaporation from bare and brush-covered soil, with and without freezing was made. *Subject Headings:* **Soil freezing effects, Soil moisture, Evaporation.**

2C–148 551.525.5(03)

Bryan, R., **Cryopedology. The study of frozen ground and intensive frost-action with suggestions on nomenclature.** *American Journal of Science*, 233:622–642, Sept. **1946.** 4 figs., 46 refs. **DLC**—*Subject Headings:* **Soil temperatures, Glossaries.**

2C–149 551.525:631.8

Davitian, G. S., **Indirect influence of chemical fertilizers upon soil temperature.** *Akademiia Nauk, SSSR, Comptes Rendus*, 51(7):539–541, **1946.** table, 2 refs. English summary. **DLC**—Observations on the temperature variations of the surface of the soil of a meadow that occur under the influence of indirect action of various chemical fertilizers. *Subject Headings:* **Soil surface temperatures, Cover influences.**

2C–150 551.525.5:656.1

Hardy, R. M., **Research on frost action in soil.** *Canadian Engineer, Roads and Bridges*, Toronto, 84(9):74–76, Sept. **1946.** 5 figs. **DLC**—General review of the work of TABER, BESKOW, and CASAGRANDE; discussion of methods for correcting frost heaves and a description of permafrost. *Subject Headings:* **Soil temperatures, Freezing soil, Permafrost, Engineering.**

2C–151 551.525.5:625(71)(79)

Hardy, R. M. and d'Appolonia, E., **Permanently frozen ground and foundation design.** *Engineering Journal*, Montreal, 29(1):4–12, Jan. **1946.** 13 figs., 2 refs. **DLC**—Part I deals with the theory of frost action in soils and presents tests recently run on samples of permanently frozen ground from Alaska and the Yukon area of Northern Canada. Part II deals with problems encountered with foundation of structures and aircraft runways in the area of permanently frozen ground in these northern regions. *Subject Headings:* **Thermal conductivity, Permafrost, Airport construction, Alaska, Northern Canada.**

2C–152 551.525:551.524(6)

Parode, H., **Sur les décalages entre variations des températures et quantités de chaleur reçues au sol.** [Relation between temperature variations and the quantities of heat received by the soil.] *Académie des Sciences, Paris, Comptes Rendus*, 223(1):384–386, **1946.** fig., ref. **DLC**—Author used the daily and annual delay of the penetration of heat into the soil for the investigation. Data secured in Ouallen (Sahara) were used. *Subject Headings:* **Thermal conductivity, Soil temperatures, Sahara Desert.**

2C–153 551.525(62)

†*Sutton, L. J., **Earth and water temperatures in Egypt. Earth temperature.** *Egypt, Physical Dept. Paper*, No. 52:4–41, **1946.** map, 4 figs., 19 tables, 23 refs., 17 equations. **DLC**—The author summarized the soil temperature observations made at various times and places in Egypt by the observing staff of the Physical Department. On the basis of many tables, analysis of following is made: annual variations, variability of monthly mean temperatures, variability of daily temperatures, comparison with air temperature, surface temperature, effect of surface covering, effect of irrigation on soil temperature, heat conduction and thermal diffusivity. The data are to a depth of 2 m. below the soil surface. *Subject Headings:* **Soil temperatures, Egypt.**

2C–154 551.525.4(72):551.21

Zies, E. G., **Temperature measurements at Parícutin Volcano.** *American Geophysical Union, Transactions*, 27(2):178–180, April **1946.** 6 refs. **MH-BH**—The temperature of the Aguan flow of lava was estimated to be 1200°C. and thus lies in the same range as that for other basaltic lava. Temperature on the older Zapichu flow was recorded as 640°C. *Subject Headings:* **Earth temperatures, Parícutin Volcano, Mexico.**

1947

2C–155 551.525.6:551.311.44(79)(6)(410)

*Birch, Francis, **Temperature and heat flow in a well near Colorado Springs.** *American Journal of Science*, 245(12):733–753, Dec. **1947.** 2 figs., 5 tables. **DLC**—The temperatures in a well near Colorado Springs were measured. Thermal gradient (20°C./km.) was calculated. Methods of temperature measurement described. The temperature and gradient for other Colorado wells, to a depth as great as 6500 ft., and tables of heat flow in Africa, Britain and the United States are given. *Subject Headings:* **Soil temperatures, Well temperatures, Colorado Springs, United States, Great Britain, Africa.**

2C–156 551.508.26

Bouyoucos, G. J., **A new electrical resistance thermometer for soil.** *Soil Science*, 63(4):291–298, April **1947.** *Highway Research Abstracts*, (141):4, May 1947. **DLC**—Description of a new electrical thermometer. The thermometer is simple, convenient and reliable for measuring soil temperature at various depths. *Subject Heading:* **Soil thermometers.**

2C–157 551.525.5:551.508:551.584

Cailleux, A. and Thellier, E., **Sur la détermination de la couche de sol gelé.** [Determination of the depth of frozen layer.] *Académie des Sciences, Paris, Comptes Rendus*, 224:1174–1175, **1947.** ref. **DLC**—Description of an installation with platinum resistance thermometers, and the results of measurements of the frozen layer made of the Observatoire du Parc Saint Maur in the winter of 1946–1947. *Subject Headings:* **Frozen soil, Soil thermometers, Microclimatology, Paris, France.**

2C–158 551.525.5:623(798):551.584

Jailite, W. M., **Permafrost research area.** *Military Engineer*, 39(263):375–379, **1947.** 13 figs. **DLC**—A discussion of the research conducted to establish construction design required in permafrost areas. It is noted that such research has been conducted for 15 years in the U.S.S.R. *Subject Headings:* **Permafrost, Microclimatology, Construction.**

2C–159 551.525.4:631.6

Roseau, H., **Relation entre les variations de la température du sol et le drainage.** [Relation between soil temperature variations and drainage.] *Académie des Sciences, Paris, Comptes Rendus*, 225:320–322, **1947.** fig. **DLC**—On the basis of observations from March 4 to 28, 1947, comparison of the temperatures above the soil surface and at a depth of 20 cm. with the data on heat emission and soil moisture, was made and general interrelations are explained. *Subject Headings:* **Soil temperatures, Thermal gradient, Soil moisture.**

2C–160 551.525.5(57)

Tumel', V. F., **O glubine sezonnogo promerzaniia gruntov v Aziatskoĭ chasti SSSR.** [On depth of seasonal freezing of soil in the Asiatic part of the U.S.S.R.] Akademii Nauk SSSR, Otdel Geologo-Geograficheskikh Nauk, Referaty nauchno-issledovatel'skikh rabot za 1945 god, Moscow, **1947.** p. 127. **DLC**—The author divides the Siberian territory into 7 parts, exclusive of the permafrost area. The depth of frost penetration in those areas varies from several cm. to 5.5 m. (A review.) *Subject Headings:* **Soil freezing, Siberia, U.S.S.R.**

2C–161 551.525.5(57)

Ul', E. F., **Sezonnoe promerzanie gruntov v tsentral'nom Zabaĭkal'e.** [The seasonal freezing of soil in the central Transbaikal region.] Izdat. Akademii Nauk SSSR, Otdel Geologo-Geograficheskikh Nauk, Referaty nauchno-issledovatel'skikh rabot za 1945 god. Moscow, **1947.** p. 170–171. **DLC**—With very heavy frost (−45°–51°C.) and insufficient snow cover (5–15 cm.) in winter, frost penetration of soil at depths from 3.5 to 5.0 m. was observed. (A review.) *Subject Headings:* **Soil freezing, Siberia, U.S.S.R.**

2C–162 551.525:551.524.3(675)

*Vandenplas, A., **La température au Congo Belge.** [Temperature in the Belgian Congo.] *Belgium, Institut Royal Météorologique, Mémoires*, Vol. 24, **1947.** 194 p. numerous tables. **DWB**—Description of soil and temperature conditions in the Belgian Congo. *Subject Headings:* **Soil temperatures, Air temperature, Belgian Congo.**

2C–163 551.525:551.508.29

Wade, F. Alton, **Sub-surface temperature measuring equipment.** *Journal of Glaciology*, 1(2):73–74, July **1947.** **DLC**—Describes instruments for measurement of soil temperature. *Subject Heading:* **Soil thermometers.**

1948

2C–164 551.501:551.525

Gutman, J., **Beobachtung- und Messmethoden des Wetterdienstes.** [Methods of observation and measurement used by the weather service.] *Austria, Zentralanstalt für Meteorologie und Geodynamik, Jahrbuch, Neue Folge*, Band **1948.** Vienna. 143 p. **DWB**—Description of the methods for determining radiation, temperature, precipitation and other meteorological phenomena. *Subject Headings:* **Soil temperature observation, Soil temperatures.**

2C–165 551.525.5:016

†National Research Council, Washington, D. C., **Bibliography on frost action in soils.** *Highway Research Board, Annotated Bibliography*, No. 3, **1948.** 57 p. **DWB**—Annotated bibliography of 283 works on frost action in soil, soil temperatures and frost heaving with classified subject and author index. *Subject Headings:* **Frozen soil, Bibliographies.**

2C–166 551.525.4

Swinbank, W. C., **Note on the direct measurement of thermal conductivity of soil.** *Royal Meteorological Society, Quarterly Journal*, 74(321–322):409–410, **1948.** **DLC**—Author shows the difficulties in the measurement of thermal conductivity of soil. Range of the heat capacity per unit volume of the soil at Cardington from summer to winter is only from 0.4 to 0.7 cal. per cc. The change during a clear night is probably negligible. *Subject Headings:* **Soil temperatures, Thermal gradient, Thermal conductivity.**

1949

2C–167 551.525.2:551.524:551.584

Arléry, R. and Dumont, A. P., **Comparaison des températures minimum au sol et sous abri.** [Comparison of minimum temperatures at the ground and in a shelter.] *La Météorologie*, 4th Ser., No. 15:157–165, July–Sept. **1949.** 6 figs., 5 tables, 23 refs. English and French summaries p. 157. **MH-BH**—This memorandum studies the frequencies of the differences of the minimum temperatures

registered in the shade and the minimum values of the actinothermic indices on the thermometer placed 10 cms. above the grass. *Subject Headings:* **Surface temperatures, Air temperature, Microclimatology.**—*Author's summary.*

2C–168 551.501.9(99)

Court, Arnold, **Temperature measurement in polar ice.** *Journal of Glaciology*, 1(5):227–230, March **1949.** 8 refs. **DWB**—Measurement of temperature by electrical means at various levels in shelf ice at depths from ½ to 64 m. made by U. S. Antarctic Service Expedition 1939–1941. The author summarizes the investigation. *Subject Headings:* **Ice thermometers, Ice temperatures, Antarctic.**

2C–169 551.525.4:551.501:536.2

Kaganov, M. A. and Chudnovskiĭ, A. F., **Opredelenie koeffitsienta temperaturoprovodnosti pochvy po dannym srokam izmereniĭ.** [Determination of the coefficient of temperature conduction of the soil.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 13(5):428–433, **1949.** fig., 2 tables, 5 refs., 11 equations. **DLC**—Method of computing the coefficient of the thermal conductivity of soil according to observations at specified hours. The computations are based on the statement that the soil temperature may be expressed by a periodic function with two harmonics. *Subject Headings:* **Thermal conductivity, Methods of computation.**

2C–170 551.525.4

Langbein, Walter B., **Computing soil temperatures.** *American Geophysical Union, Transactions*, 30(4):543–547, Aug. **1949.** 4 figs., 3 tables, 4 refs., 3 equations. **DWB**—Description of the method for computing soil temperature from surface temperature. This method is adaptable to the irregular fluctuation in temperature ordinarily found in nature as well as to ideal cases. Bliss' data were used for comparison of observed and computed temperatures at depths up to 4 feet. *Subject Headings:* **Soil temperatures, Thermal gradient.**

2C–171 551.525(45)

*Penta, Francesco, **Temperature nel sottosuolo della regione "Flegrea."** [Soil temperature in the Phlegraean Plains.] *Annali di Geofisica*, 2(3):328–346, July **1949.** 7 figs., 7 photos, 6 tables, 22 refs. **MH-BH**—Good data from many years of observation. (*Same item* as No. 2.2–90 in Feb. 1951 *Meteorological Abstracts.*) *Subject Headings:* **Soil temperatures, Italy.**

2C–172 551.525.5(57)

Shul'gin, A. M., **K voprosu o melioratsii pochvennogo klimata v Altaĭskom Krae.** [On the problem of the amelioration of soil climate in the Altai area.] *Pochvovedenie*, No. 1:54–56, Jan. **1949.** 5 refs. **DLC**—The results of climatological investigations in the Altai region are described. Because of heavy frost in winter and light snow cover the penetration of frost into the soil is very considerable. The normal depth of the frozen soil in this region is 2 m. below the surface. (*Same item* as No. 7–110 in July 1950 *Meteorological Abstracts.*) *Subject Headings:* **Soil freezing, Siberia, U.S.S.R.**

2C–173 551.525(43)

Weger, Nikolaus, **Bodentemperaturen in Beeten verschiedener Form und Richtung.** [Soil temperatures in beds of different shape and direction.] *Meteorologische Rundschau*, 2(9–10):291–295, **1949.** 5 figs., 2 tables. **MH-BH**—Observations at Geisenheim in the Rhine region of Germany made during 1948 at a depth 5 cm. below surface of the beds. The results of the investigation are summarized. (*Same item* as No. 7–70 in July 1950 *Meteorological Abstracts.*) *Subject Headings:* **Soil temperatures, Geisenheim, Germany.**

1950

2C–174 551.525:551.501

Balls, W. L., **Soil temperatures on tap.** *Weather*, 5(2):40–43, Feb. **1950.** 2 figs., table, 11 refs. **MH-BH**—Mean soil temperatures at three feet depth obtained from temperature of tap water after long passage through buried mains. (*Same item* as No. 4–5 in April 1950 *Meteorological Abstracts.*) *Subject Heading:* **Soil temperatures.**

2C–175 551.525.4:551.525.6

Benfield, A. E., **Heat flow in the earth.** Abstract of seminar at the Geophysical Research Directorate on March 3, **1950.** 9 p. table, 12 refs., 2 equations. (Typewritten.) **MH-BH**—A discussion of the amount of heat flowing radially to the surface of the earth from below. This investigation is based on thermal conditions in wells, tunnels and mines. *Subject Headings:* **Earth temperatures, Well temperatures, Mine temperatures.**

2C–176 551.508.26

Brun, M. E., **Thermomètre de surface.** [Soil surface thermometer.] *France, Centre National de la Recherche Scientifique, Journal des Recherches*, No. 10:21–22, **1950.** **MH-BH**—Description of thermometers for measurement of soil surface temperature. *Subject Heading:* **Soil thermometers.**

2C–177 551.582.3(43)

Germany. Deutscher Wetterdienst in der US-Zone, **Klima-Atlas von Hessen.** [Climatic atlas of Hesse.] Bad Kissingen, **1949/50.** 20 p. 75 maps, 9 diagrs., 2 tables. In portfolio. **MH-BH**—This climatic atlas was prepared by the Climatological Division of the Weather Service in the U. S. Zone of Germany under the direction of Prof. KARL KNOCH. In the first part the description of the individual maps and diagrams is given briefly. The second part (appendix) presents maps and diagrams of annual and seasonal variations of the principal meteorological elements, based on long period data of observation (temperature, pressure and relative humidity of the air, precipitation, winds, cloudiness and sunshine) and maps of phenological data. Special maps and tables show the peculiarity of the individual region of Hesse. *Subject Headings:* **Climatology, Atlases, Hesse, Germany.**—*M.R.*

2C–178 551.525.4:631.4

Kolmogorov, A. N., **K voprosu ob opredelenii koeffitsienta temperaturoprovodnosti pochvy.** [The determination of the coefficient of heat conductivity in the soil.] *Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz.*, 14(2):97–98, March–April **1950.** table, ref., 5 equations. **DLC**—Discusses a method of determination of heat conductivity of soil by measuring the temperature at two depths four times at intervals of 6 hours as proposed by KAGANOR and CHUDNOVSKIĬ. These authors used the variation with depth of the phase of the daily temperature wave, although it is difficult to arrange the observations for fulfillment of the condition that the phase must be less than 180°. By taking account of the change in amplitude as well, the difficulty can be overcome. (*Same item* as 2.2–91 in Feb. 1951 *Meteorological Abstracts.*) *Subject Heading:* **Soil conductivity.**—*M.R.*

2C–179 551.525.5:551.578.46:551.588.6

Molchanov, A. A., **Promerzanie i ottaivanie pochvy.** [Freezing and thawing of soil.] *Lesnoe Khoziaĭstvo*, Moscow, 3(1):27–31, Jan. **1950.** 7 tables. **DLC**—On the basis of some detailed but fragmentary data made by the Institute of Forestry of the Akademiia Nauk on the temperature of snow and soil at various depths (0 to 60 cm.) at 7, 13 and 19 h. (1945–1948), the author confirms recent ideas about the connection between the character of the snow cover, etc. and the depth of freezing of soil. Determination of depth of freezing cannot be precise when thermometers are used, because the freezing point varies with physical and chemical composition of soil. Heavy lime soils do not freeze even at temperatures much below the usual (−0–1 to −0.5°C.). The speed of spring thawing also varies, the daily mean ranging from a speed of 8 cm. to 0.1 cm. The highest speed occurs in pine forests and the lowest in bare fields. (*Same item* as No. 10–100 in Oct. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Soil freezing, Snow temperatures, Forest influences, U.S.S.R.** —*M.R.*

2C–180 551.525.536.6

Skeib, G., **Ein Messverfahren zur Bestimmung der Wärmekapazität des Erdbodens mittels konstant beheizter Testkörper.** [An experiment in determining the heat capacity of the ground by means of a constantly heated test body.] *Zeitschrift für Meteorologie*, 4(1–2):32–39, Jan.–Feb. **1950.** 9 figs., table, 5 refs., 30 equations. **MH-BH**—Pt. A. discusses the mathematical theory of heat loss from a cylindrical or spherical body inserted in a conducting medium, deriving expressions for heat conductivity and heat capacity of the medium. A thin graphite rod (radius 1.1 mm., length 12.8 cm.) was inserted horizontally in soil, etc., with a thermoelement in the middle connected to a galvanometer. Pt. B. describes setup and results, quoted for cement powder, sand nearly dry and saturated and loose humus. (*Same item* as No. 10–99 in Oct. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Soil temperatures, Thermodynamics.**—*C.E.P.B.*

2C–181 551.525(47)

Tardos, Viktor, **Talajklimatológiai tanulmányok a Szovjetunióban.** [Soil climatology in the Soviet Union.] *Időjárás*, 55(5–6):139–140, May–June **1950.** ref. **MH-BH**—Short history of investigations of soil climate in the Soviet Union. *Subject Headings:* **Soil climate investigations, U.S.S.R.**

2C–182 551.525:551.501:551.584(74)

*Thornthwaite, Charles W., **Micrometeorology of the surface layer of the atmosphere.** *Johns Hopkins University, Laboratory of Climatology, Interim Report*, No. 10, June 30, **1950.** 79 p. 8 figs., 4 tables, 12 append. **MH-BH**—This is a report on special micrometeorological observations made at Seabrook, New Jersey during 1950. On the soil temperature question, the laboratory gives two

different sets of soil temperatures obtained in the experimental garden for depths at 2, 4, 6, 10 and 16 inches made with bimetallic thermometers, and for depths at 2.5, 5, 10, 20 and 40 cm. with thermocouples. *Subject Headings:* **Soil temperatures, Soil temperature observation, Micrometeorology, Seabrook, New Jersey.**

2C–183 551.525.5:551.506.3(73/9)

U. S. Weather Bureau, **Average and extreme depth of frost penetration.** U. S. Weather Bureau, undated maps. **DWB**—*Subject Headings:* **Frozen soil, United States.**

2C–184 551.525:551.579.2(57)

*Verner, A. P. and Verner, M. F., **Temperatura i vlazhnost' pochvy pri snegozaderzhanii v usloviiakh tsentral'noĭ Baraby.** [Temperature and moisture of soil during snow retention in Central Baraba.] *Pochvovedenie*, No. 6:340–353, June **1950.** 3 figs., 10 tables, 10 refs. **DLC**—Study of the effect of snow-cover on the temperature and moisture of the soil. Comparative tables for temperature and moisture of the soil for variable snow conditions are given. (*Same item* as 10–143 in Oct. 1950 *Meteorological Abstracts.*) *Subject Headings:* **Soil temperatures, Soil moisture, Snow retention, Western Siberia, U.S.S.R.**

SUPPLEMENTARY MATERIAL

(Came to our attention too late for inclusion in proper order)

2C–185 551.525:551.524(47)

*Schweder, Gotthand, **Die Bodentemperaturen bei Riga.** [Soil temperatures near Riga.] Riga, W. E. Hacker, **1899.** 24 p. numerous figs., tables and refs. **DLC**—The author analyzes data of soil temperature observations made near Riga from 1883 to 1893 at depths from 0.1 m. to 2.8 m. Monthly and annual variations of soil and air temperatures are compared and studied. *Subject Headings:* **Soil temperatures, Air temperature, Riga, U.S.S.R.**

2C–186 551.525:551.584.42(94)

Musson, C. T., **Soil temperature at Hawkesburg Agricultural College, Richmond, N. S. W.** *Agricultural Gazette of N.S. Wales, Miscellaneous Publication*, No. 479, June **1901.** 12 p. numerous figs. and tables. (Reprint available.) **DLC**—The observations of soil temperature were taken at ½ inch, 6 inches, 1 foot and 2 ft. below the surface. They were made for the first seven days in each month during the period from May 1898–April 1899. Monthly variations of soil temperature, effect of rainfall and heat requirement of plants are analyzed. *Subject Headings:* **Soil temperatures, Rainfall effects, New South Wales, Australia.**

2C–187 551.525:551.584.41

†*Li, Tsi-tung, **Soil temperature as influenced by forest cover.** *Yale University, School of Forestry, Bulletin*, No. 18, **1926.** 92 p. 21 figs., 16 tables, 64 refs. **DLC**—The effect of forest and grass cover on soil temperature, air temperature, evaporation and soil moisture was observed. Soil temperatures were taken in a soil well at depths of 6, 12 and 24 inches with maximum and minimum thermometers. The author gives a historical review of various European and American studies on the effect of forests upon soil temperature. The inclusion of numerous tables and diagrams makes this a well-illustrated study. *Subject Headings:* **Soil temperatures, Forest influences, Vegetative influences.**

2C–188 551.525:551.582(675)

†*Bernard, Étienne, **Le climat écologique de la Cuvette centrale congolaise.** [The ecological climate of the central Congo Basin.] Brussels, Publications de l'Institut National pour l'Étude Agronomique du Congo Belge (I.N.E.A.C.), **1945.** 240 p. 36 figs., 2 charts, 70 tables, 176 refs. **DWB**—Chap. 4 (p. 79–93) contains a study of soil temperatures at Bambesa and Yangambi in the Belgian Congo, based upon data from 1936–1939. Data are presented on the march of mean annual soil temperature, mean daily march of soil temperature (8h, 12h and 17h), mean absolute max. and min. temperature and the annual march of thermal conductivity of the soil. Also effect of plant cover upon soil temperature is discussed. (*Same item* abstracted in full in *Meteorological Abstracts* No. 8–110, Aug. 1950.) *Subject Headings:* **Soil temperatures, Plant ecology, Belgian Congo.**—*I.L.D.*

2C–189 551.525

†Chudnovskiĭ, A. F., **Fizika teploobmena v pochve.** [Physics of heat exchange in the soil.] Leningrad, OGIZ, **1948.** 220 p. 44 figs., 13 tables, 179 refs., 188 equations. **DLC**—The author presents the theoretical basis and experimental procedures for studying heat exchange in the soil.

He sets up a physico-mathematical model with heat balance equations for describing the heat exchange within the soil and analyzes mathematically the role of the heat exchange of the soil in the general heat balance and its significance in microclimatology and in the cooling of the upper soil layer. Various procedures for determining the heat conductivity of soil, heat capacity of soil, etc. are presented. The dependence of thermal properties upon chemical and mineral characteristics of the soil, the effect of soil temperature upon its thermal properties, the dependence of thermal properties upon soil moisture and the daily heat regime at various depths are considered. A theory for the diffusion of heat in the upper layers of the soils is presented and its application in determining soil moisture by means of thermal properties of the soil and for calculating radiational cooling by means of heat balance is illustrated. *Subject Headings:* **Heat exchange, Soil temperatures.**—*I. L. D.*

2C–190 551.582:551.525(92)

Braak, C., **Het klimaat van Nederlandsch-Indië.** [The climate of the Netherlands Indies.] *Indonesia, (K.) Magnetische en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 8. Vol. 2:237, 512–515, 1928, 1929. **DLC**—Annual march of soil temperature for one year in various places in the Netherlands East Indies is presented in tabular form. Measurements were made at depths of 30 and 60 cm. in primitive forest and in open fields, under asphalt and under bare ground. *Subject Headings:* **Soil temperatures, Climatology, Idonesia.**—*I. L. D.*

2C–191 551.525:551.525.4:551.524(73/9)

*†Fitton, Edith M. and Brooks, Charles F., **Soil temperatures in the United States.** *Monthly Weather Review*, 59(1):6–16, Jan. **1931.** 7 figs., 3 tables, 60 refs. **DWB**—The soil temperatures under different types of cover, the variations of the soil temperatures at different depths and with various types of the soil and the interrelations between air and soil temperatures are given for 32 agricultural experiment stations in the U. S. The stations, though few in number, are fairly representative for the various regions of the United States. The depths of temperature observations ranged from a few inches to 3 feet; in general, the soil temperatures were not obtained at identical depths. *Subject Headings:* **Soil temperatures, Cover influences, United States.**

2C–192 551.5(06)

International Meteorological Organisation, Kommission für Landwirtschaftliche Meteorologie, **Protokolle der Tagung in Danzig 28–31, August 1935.** [Transactions of the session at Danzig August 28–31, 1935.] O.M.I. Publication No. 24, Leyde, Holland, **1936.** 308 p. **DWB**—This publication contains extensive bibliographies on various aspects of agricultural meteorology including soil temperatures in the participating countries. These bibliographies were prepared in Germany, England, France and her colonies, Sweden, U.S.S.R., Austria, India, Norway, and Switzerland. In addition there are short papers, including some of the effects of soil temperatures on plant growth or crop production (i.e. in India, Indochina and Siberia). *Subject Headings:* **Soil temperatures, Agricultural meteorology, Bibliographies, Danzig Conference.**—*M. R.*

2C–193 551.584:551.525

†*Wolfe, John Nicholas, Wareham, Richard T. and Scofield, Herbert T., **Microclimates and macroclimate of Neotoma, a small valley in central Ohio.** *Ohio Biological Survey, Bulletin* 41, 8(1), Oct. **1949.** 267 p. 97 figs., 85 tables, 223 refs. Summary p. 239–246. **DWB**—A section of Chap. 6 entitled: "Temperatures of the soil," p. 154–163, is devoted to a microclimatic study for development of the leaf litter influence on soil surface temperature made during 1942–1943 at Neotoma Valley, Ohio. For this purpose 13 stations equipped maximum and minimum thermometers on soil surfaces (with heavy, medium and sparce litter and litter free) were established. The records are summarized and analyzed. *Subject Headings:* **Soil temperatures, Cover influences, Neotoma Valley, Ohio.**

2C–194 551.577.38 551.525:551.579.5:631.43

Kreutz, Wilhelm, **Bodenerwärmung und Trockenheit sowie Ursachen der Dürre im ungewöhnlichen langen und heissen Sommer 1947.** [Soil warming and dryness and the causes of drought in the unusually long and hot summer of 1947.] *Zeitschrift für Meteorologie*, 4(7–8):195–212, July–Aug. **1950.** 4 figs., 5 tables. **MH-BH**—The effect of the unique heat and drought of April–Oct. 1947 was studied by lysimeter in different soils around Giessen. Geoisotherms of soil temperature show abnormally high values in August (sand 21.6, loam 22, humus 25°C. even at 1 meter, 5–7°C. higher than 1939–41). Diurnal variation in different soils shown down to 50 cm. Rise of temperature was helped by deep soil cracks. Pt. II described water-balance of different soils. Annual percolation 1947 varied from 28% (sand) to 5% (loam) and in loam and humus ceased from May to Nov. Ground-water fell markedly and growth of many plants ceased. Climate in some crop stands was even more extreme than in open; this and lack of dew added to effects of drought. *Subject Headings:* **Soil temperatures, Drought, Soil moisture, Giessen, Germany.**—*C.E.P.B.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes. When material is furnished in advance of date of publication, the pagination may be omitted.

Annales de Géophysique, Volume 5, Number 1, January 1949.

Dufay, Maurice: **Recherches sur l'émission des bandes négatives de l'azote au crépuscule,** [Research on the emission from negative nitrogen bands at twilight], p. 2–24.

Visser, S. W.: **Les taches solaires et la météorologie. III. Les hivers extrêmes,** [Sunspots and meteorology. III. Extreme winters], p. 74–82.

Barbier, Daniel: **Comparaison des formules donnant les corrections d'extinction dans les observations du ciel nocturne,** [Comparison of formulas giving the corrections of extinction in observations of the night sky], p. 83–84.

Lecolazet, Robert: **Nouvelles mesures du champ électrique atmosphérique en planeur,** [New measurements of the atmospheric electric field by a glider], p. 84–86.

Molard, P. and Jolivet, J.: **Mesures de charges électrostatiques faibles avec du matériel radio ordinaire; application aux mesures d'électricité atmosphérique,** [Measurements of weak electrostatic charges with ordinary radio equipment for the purpose of measuring atmospheric electricity], p. 86–88.

Queney, Paul: **Rapport sur le développement de la météorologie dynamique aux États-Unis pendant la période 1937–1947,** [Report on the development of dynamic meteorology in the United States during the period 1937–1947], p. 89–97.

Annales de Géophysique, Volume 5, Number 2, February 1949.

Dufay, Jean and Tcheng, Mao-Lin: **Recherches sur les spectres des éclairs. Première partie, Étude des spectres, de 3830 à 6570 Å, au moyen de spectrographes à fente,** [Research on lightning spectra. Part 1, Study of spectra, from 3830 to 6570 Å, by means of "slit" spectrographs], p. 137–149.

Höchtl, Fritz and Rawer, Karl: **Observations de la couche E sporadique de l'ionosphère réalisées par plusieurs stations en Europe,** [Observations of the sporadic E-layer of the ionosphere carried out by several stations in Europe], p. 150–156.

Abadie, P., Vassy, A., and Vassy, Étienne: **Sur la lumière du ciel nocturne; effet de latitude,** [Light of the night sky; effect of latitude], p. 157–163.

Godefroy, Alain: **Appareil enregistreur pour la mesure des résistances élevées et variables; application à la mesure de la conductibilité électrique de l'air,** [Registering apparatus for the measurement of high and variable resistance; application to the measurement of electric conductivity of the air], p. 164–166.

Donitch, N.: **Variations d'aspect de la lumière zodiacale observées le 24 mars 1946 à Tamanrasset (Hoggar, Algérie méridionale),** [Variations of the aspect of zodiacal light observed on March 24, 1946 at Tamanrasset (Hoggar, southern Algeria)], p. 167–170.

Annales de Géophysique, Volume 5, Number 3, July–September 1949.

Dufay, Jean: **Spectre du ciel nocturne dans le proche infrarouge,** [Spectra of the night sky in the near infrared], p. 183–187.

Israël, H.: **Die Tagesvariation des elektrischen Widerstandes der Atmosphaere. (Studien ueber das atmosphaerische Potentialgefaelle II),** [Diurnal variation of electric resistance of the atmosphere. (Studies of atmospheric potential gradient II)], p. 196–210.

Jolivet, J.: **La couverture nuageuse de la montagne Pelée,** [Cloud cover of Mount Pelee], p. 211–212.

Maire, J.: **Note sur les relations entre l'agitation du champ magnétique terrestre et l'agitation ionosphérique observée dans les radiocommunications transcontinentales par ondes décamétriques,** [Note on the relation between the disturbance in the terrestrial magnetic field and ionospheric disturbance observed in transcontinental radiocommunication by 10 m. waves], p. 216–220.

Gallet, R.: **Sur l'effet de longitude dans la couche F2 de l'ionosphère,** [On the effect of longitude in the F2 layer of the ionosphere], p. 220–225.
Prudhomme, André: **Les vitesses ascensionnelles des ballons de radiosondages,** [The rate of ascent of radiosonde balloons], p. 225–232.
Gabilly, A.: **Sur le rôle que peuvent jouer les rafales dans la coalescence des gouttelettes d'un nuage,** [On the role that gusts play in the coalescense of cloud droplets], p. 232–234.
Prudhomme, André: **Le spectre d'absorption infrarouge de la vapeur d'eau au point de vue de ses applications atmosphériques,** [Infrared absorption spectrum of water vapor and its atmospheric application], p. 236–247.

Annales de Géophysique, Volume 5, Number 4, October–December 1949.

Dufay, Maurice: **Recherches sur les spectres des éclairs,** [Research of the spectra of lightning], p. 255–263.
Dessens, Henri: **Les altocumulus lenticularis margarodes,** [Iridescent altocumulus lenticularis], p. 264–274.
Nicolet, M. and Bossy, L.: **Sur l'absorption des ondes courtes dans l'ionosphère,** [On the absorption of short waves in the ionosphere], p. 275–292.
Prudhomme, André: **Recherches sur un nouveau procédé hygrométrique,** [Research on a new method of hygrometry], p. 293–309.
Israël, H. and Kasemir, H. W.: **In welcher Hoehe geht der weltweite luftelektrische Ausgleich vor sich?,** [At what height does atmospheric electric equilibrium take place?], p. 313–324.
Jouaust, Raymond: **Les études récentes sur l'ionosphère,** [Recent studies on the ionosphere], 325–330.

Annales de Géophysique, Volume 6, Number 1, Jan.–March 1950.

Penndorf, Rudolph: **The annual variation of the amount of ozone over northern Norway,** p. 4–9.
Bruet, E.: **La Soufrière de la Guadeloupe: contribution à l'étude des édifices volcaniques peléens,** [The Soufriere volcano in Guadeloupe: contribution to the study of Pelean structures], p. 51–64.
Robley, R., Bricard, J. and Kastler, A.: **Le spectre de l'aurore boréale du 25 au 26 janvier 1949,** [The spectrum of the aurora borealis of January 25 to 26, 1949], p. 66–67.
Pluvinage, Philippe: **Sur la pollution de l'air au Groënland,** [Air pollution in Greenland], p. 68.
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Prudhomme, André: **Les procédés hygrométriques,** [Hygrometric procedures], p. 117–127.
Dessens, H. and Fournier d'Albe, E. M.: **Première campagne d'étude des orages pyrénéens,** [First study of thunderstorms in the Pyrenees], p. 130–132.

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Tu, Chang-wang and Niu, Tien-jen: **Summer flood and drought in the Lower Yangtze Valley,** p. 27–39.
Jaw, Jeou-jang: **On the stability of zonal circulation,** p. 66–73.
Tschu, K. K.: **On the determination of lunar and luni-solar daily variations in certain geophysical data by means of the Chapman-Miller method,** p. 74–82.
Jong, P. C.: **The Kunming quasi-stationary front,** p. 87–103.
Koo, Chen-chao: **Some aspects of the cut-off cyclonic vortices,** p. 104–120.
Tao, Shih-yen: **The moist and dry climate of China,** p. 121–130.
Chu, P. H.: **The frontal waves in spring in China,** p. 131–143.

Geophysical Magazine, Tokyo, Volume 22, Number 1, October 1950.

Miyake, Y. and Sugiura, Y.: **A study on nitrogen compounds in the atmosphere,** p. 1–4.
Miyake, Y. and Saruhashi, K.: **The variation of the ultraviolet solar radiation during the eclipse,** p. 5–9.
Tsuji, M.: **On the rate of evaporation and condensation of falling drops,** p. 11–14.
Tsuji, M.: **On the saturated vapour pressure over small drops of aqueous solution,** p. 15–20.
Sekihara, K. and Kawamura, K.: **A study of the distribution of ultraviolet sky radiation,** p. 21–28.
Sekiguchi, T.: **Introduction to local climatology,** p. 29–33.
Yamamoto, T.: **On the secular change of the climate in Japan (II),** p. 35–70.

Geophysical Magazine, Tokyo, Volume 22, Number 2, November 1950.

Fujita, T.: **Micro-analytical study of thunder-nose,** p. 71–88.
Sekiguchi, T.: **Local climatological study of the 80% flowering dates of cherry blossom (*prunus subhirtella*) at the Akaho Fan, Kami-ina, Nagano Pref.,** p. 89–97.
Nakada, Y.: **Long-range forecasting by periodicity extrapolation method,** p. 99–108.
Tajima, S.: **On the meridional oscillation of anticyclone of horse latitudes in Japan and its effect on the weather,** p. 109–130.
Arizumi, N.: **A diagrammatic method of computing vertical motion in the atmosphere and its applications,** p. 131–141.
Kawabata, Y. and Fujito, M.: **Distribution of total horizontal insolation in Japan and its neighborhood,** p. 143–155.
Ishimaru, Y.: **Cloud and upper air current observation during the Second International Polar Year (July 1932 to August 1933) at Haneda weather station in Tokyo Air Port,** p. 157–175.

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Levert, C.: **Weeroverzicht October 1950,** [Weather summary October 1950], p. 209–210.
van der Ham, C. J. and Kuipers, W. J. A.: **Karakteristieke weertypen IV,** [Characteristic weather types IV], p. 211–213.
Visser, S. W.: **Typhoon of Taifoen?** [Typhoon or taifoen?], p. 214.

Hemel en Dampkring, Volume 49, Number 1, 1951.

Levert, C.: **Waar komen in ons land de laagste en waar de hoogste temperaturen voor?** [Where does the lowest and the highest temperature occur in our country?], p. 12–14.

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Schmidt, F. H. and Schregardus, M. W. F.: **Iets over de weerdienst in Indonesië,** [Something about the weather service in Indonesia], p. 23–31.
Levert, C.: **Uiterst zware regens,** [Extreme heavy rain], p. 32–35.
van der Ham, C. J.: **De luchtdrukverdeling tijdens het winterse weer in December 1950,** [The pressure distribution at the time of the severe winter weather in December 1950], p. 37–39.

Hemel en Dampkring, Volume 49, Number 3, 1951.

Schmidt, F. H. and Schregardus, M. W. F.: **Iets over de weerdienst in Indonesië,** [Something about the weather service in Indonesia], p. 54–59.
Levert, C.: **Weeroverzicht Januari 1951,** [Weather summary for Jan. 1951], p. 59–60.

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Simomura, T. and Koizumi, M.: **Report on the oceanographical observations from Tori-Sima to the sea off Sanriku district,** p. 55–74.
Koizumi, M. and Asaoka, O.: **The oceanographical conditions of the sea off Tôhoku district in autumn of 1948,** p. 74–85.
Masuzawa, J.: **The oceanographical conditions off Ensyu in December 1948,** p. 85–92.
Marumo, R.: **The oceanographical conditions of Sagami Bay in February, May and July, 1948,** p. 92–103.
Fukuoka, J.: **The oceanographical conditions at the "fixed point," long. 153°E, lat. 39°N.,** p. 104–110.
Kito, M.: **On the composition of plankton at the "fixed point," long. 153°E, lat. 39°N.,** p. 110–114.

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Unoki, S.: **On the tidal and oceanic currents in the Tsugaru Straits,** p. 1–3.
Masuzawa, J.: **Some examples of typhoons as a motive of variations of oceanographic conditions,** p. 4–9.
Fukuoka, J.: **On the "Oyaso,"** p. 10–14.
Nanniti, T.: **On the oceanographical conditions of the sea off Tokaido,** p. 15–22.
Seki, S.: **On the tide of Nagoya harbour,** p. 23–29.
Fukuoka, J.: **A method of forecasting oceanographic conditions,** p. 30–38.
Marumo, R.: **Phytoplankton and sea conditions in summer at the fixed point, 29°N, 135°E, south off Honshu,** p. 39–45.

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Fujisan, Ibukiyama and Iwateyama Weather Station: **Report on the investigation of Nebelfrost (2nd Report),** p. 260–284.
Kato, T.: **An investigation of wind in Osaka,** p. 287–293.
Yamashita, Y.: **Influence of easterly trough on Japan,** p. 294–300.

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Masatsuka, A.: **On the land-slip Gözu,** p. 301–309.
Mitani, I.: **Report of wind observation on Kawaguchi wireless tower (1st Report),** p. 310–318.
Kasamura, S.: **A relation between the path of typhoon or line of discontinuity and the rainfall distribution in the basin of the river "Onga,"** p. 319–322.
Fujita, T.: **A note on correlation,** p. 323–328.

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Utsumi, T. and Hata, K.: **A list of floods in Tohoku district,** p. 329–356.

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Sagara, D. and Tsukamoto, K.: **Test of an automatic weather station, Part I and II,** p. 1–18.
Narabe, W.: **Floods in the basin of river Ishikari,** p. 19–43.

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Saito, Y.: **One problem of the stationary drift-circulative current in a polytropic ocean,** p. 35–61.
Arakawa, H.: **Path of cyclones and orographic rainfall,** p. 62–66.
Ogiwara, S.: **The vertical transfer of heat and the change of air temperature by turbulence,** p. 66–70.
Miyata, Y.: **On the deformation of colliding water drops (I),** p. 71–75.

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Syōno, Sigekata, Gambo, K., and others: **On the numerical prediction (I),** p. 77–99.
Homma, S. and Nagahasi, F.: **On the migration of the centre of seismic activity in Japan,** p. 100–104.

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Okubo, A. and Nakamura, N.: **Cold stratosphere accompanying a typhoon,** p. 107–112.
Imai, I.: **On the velocity of falling raindrops,** p. 113–118.
Tsuji, M.: **On the rate of evaporation of water drops,** p. 119–121.
Tsuji, M.: **On the growth of cloud particles and the degree of supersaturation in convective clouds,** p. 122–130.
Homma, S.: **Seismic sea waves proceeding for a continental coast,** p. 130–136.

Meteorological Society of Japan, Journal, 2nd Series, Volume 28, Number 5, May 1950.

Masuda, Y.: **On the resonance of pressure waves and temperature waves,** p. 139–148.
Imai, I.: **On the capture of fog particles by a circular cylinder,** p. 149–156.
Ohta, S.: **On a simple nucleus-counter,** p. 157–161.
Ohta, S.: **On the wall-effect of a nucleus-counter,** p. 161–167.
Shiotani, M.: **Turbulence in the lowest layer of the atmosphere (3),** p. 167–177.
Shinkai, K.: **On the time variation of the amount of nitrogen compounds in thunder-shower and their causes of formation,** p. 177–180.

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Shiotani, M.: **Turbulence in the lowest layer of the atmosphere, (4th report),** p. 181–187.
Ohta, S.: **On the vertical distribution of condensation nuclei,** p. 188–200.
Kawabata, Yukio: **Harmonic analysis of solar annual and solar semi-annual tide in Japan,** p. 201–209.
Yamamoto, T.: **On the problems of heat transfer in the neighbourhood of Japan,** p. 211–218.

Meteorological Society of Japan, Journal, 2nd Series, Volume 28, Number 7, July 1950.

Inoue, E.: **On the structure of wind near the ground, I.,** p. 219–223.
Izawa, Tatsuo: **On the upper disturbances in the westerlies whose mean circulation have longitudinal wind gradient,** p. 224–232.
Arakawa, H.: **Existence of descending motion in typhoon area,** p. 233–235.
Sato, T.: **Mathematical computation of insolation,** p. 236–241.
Sato, T.: **The structure of stationary discontinuous surface, I.,** p. 242–248.

Meteorological Society of Japan, Journal, 2nd Series, Volume 28, Number 9, September 1950.

Unoki, S.: **On the variation of sea level caused by the variation of atmospheric pressure. (An investigation on meteorological tides in the neighbouring seas of Japan—First paper),** p. 321–339.
Inoue, Eiichi: **On the structure of wind near the ground (II),** p. 339–345.
Ogiwara, S. and Ôkita, T.: **Studies on Tsunami on the Pacific coasts of Northern Honshû. (The model experiment of Tsunami in Shizukawa harbour),** p. 346–352.
Tsubota, Hiroshi: **Relation between the inclination of a streamer and wind velocity,** p. 352–355.

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Ohta, S.: **On the contents of condensation nuclei and uncharged nuclei on the Pacific Ocean and the Japan Sea,** p. 357–366.
Inoue, Eiichi: **On the structure of wind near the ground, III,** p. 367–376.
Sato, Tadasi: **Structure of the stationary discontinuous surface. (Part 2),** p. 376–384.
Masaki, Hikaru: **On the measurement of atmospheric radiation by using infra-red filters,** p. 384–389.

Meteorological Society of Japan, Journal, 2nd Series, Volume 28, Number 11, November 1950.

Ogiwara, S.: **On the solid condensation nucleus which is not soluble in water. (Studies on the formation of cloud and rain III),** p. 391–397.
Kobayasi, A.: **On the evaporation of a moving small liquid particle,** p. 398–404.
Mine, Eiji: **Researches on the limb darkening of the sun by the observation of annular eclipse,** p. 404–407.
Ishikawa, G.: **On the astatic-magnet variometer,** p. 407–418.
Takahasi, K.: **A note on the wave length in the westerlies,** p. 418–420.
Inoue, Eiichi: **The application of turbulence theory to the oceanography,** p. 420–424.

Meteorological Society of Japan, Journal, 2nd Series, Volume 28, Number 12, December 1950.

Sato, Tadasi: **Structure of the stationary discontinuous surface. (Part 3),** p. 431–432.
Yamamoto, G. and Miura, A.: **Saturation vapour pressure and size of condensation nucleus,** p. 432–440.
Inoue, Eiichi: **On the turbulent diffusion in the atmosphere. (I),** p. 441–456.
Hatakeyama, H. and Utikawa, K.: **On the disturbance of the atmospheric potential gradient caused by the eruption smoke of the volcano Aso,** p. 456–462.

Meteorologiske Annaler, Volume 3.

No. 1, 1948

Spinnangr, Gunnar: **On fog over snow-covered ground in Finnmarksvidda,** p. 1–12.

No. 2, 1949

Johannessen, Thor Werner: **Some computations of the atmospheric turbulence,** p. 14–58.

No. 3, 1949

Langlo, Kaare: **The effects of the solar eclipse on July 1945 on the air temperature and an examination of the lag of a thermometer exposed in a screen,** p. 59–74.

No. 4, 1950

Spinnangr, Gunnar: **Fog and fog forecasting in northern Norway,** p. 75–136.

No. 5, 1950

Knudsen, John: **On a warm front surface over south-western Norway,** p. 137–155.

No. 6, 1950

Moene, Asmunn: **Atmospherical solenoids and sea level pressure variations,** p. 157–189.

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Burgos, Juan Jacinto and Vidal, Arturo L.: **Los climas de la República Argentina, según la nueva clasificación de Thornthwaite,** [The climates of the Argentine Republic according to Thornthwaite's new classification], p. 3–32.

Schwerdtfeger, Werner: **Bases para el pronóstico a medio plazo de las condiciones de temperatura en el otoño de Buenos Aires,** [Bases for medium range forecasting of temperature conditions in autumn in Buenos Aires], p. 33–45.

Marchetti, Adolfo A.: **Oscilaciones extremas de la cantidad de precipitación en la República Argentina,** [Extreme oscillations of the amount of precipitation in the Argentine Republic], p. 46–54.

Dedebant, G., Di Maio, R. and Lutzow-Holm, O.: **Enseñanzas de una nivelación barométrica,** [Techniques in barometric leveling], p. 55–72.

Ledesma, Néstor René: **La floración del duraznero y su relación con las temperaturas de invierno y de primavera,** [Flowering of peaches and its relation to winter and spring temperatures], p. 73–90.

Raffo, José Maria: **Pronóstico de las crecientes del Río Paraná,** [Forecasts of the floods of the Paraná River], p. 91–98.

Brazol, Demetrio: **La temperatura biológica óptima,** [The optimum biological temperature], p. 99–106.

Short Notes

Celeste, Raimundo: **Apunte sísmico del noroeste de la Provincia de la Rioja,** [Seismic notes on the northwest part of Rioja Province], p. 107–108.

Collasius, Bruno: **Frecuencia de series de días de visibilidad horizontal de 10 kilómetros o más en el Observatorio de las Islas Orcadas 1932,** [Frequency of series with horizontal visibility of 10 km. or more at the Observatory on the South Orkney Islands, 1932], p. 108–109.

78° Aniversario del Servicio Meteorólogico Nacional, [78th Anniversary of the National Meteorological Service], p. 110–114.

Monthly Weather Review, Volume 78, Number 12, December 1950.

Kangieser, Paul C.: **Refraction phenomena affecting ceilometer observations,** p. 211–216.

Aubert, Eugene J.: **The weather and circulation of December 1950,** p. 217–219.

Fulks, J. R. and Smith, Clarence D., Jr.: **A December storm accompanied by tornadoes,** p. 220–225.

Monthly Weather Review, Volume 79, Number 1, January 1951.

Laird, Harley D.: **Forecasting precipitation on the West Slope of Colorado,** p. 1–7.

Norton, Grady: **Hurricanes of the 1950 season,** p. 8–15.

Cline, William H.: **The weather and circulation of January 1951,** p. 16–19.

Miller, Charles M. and Gould, Donnell H.: **The extensive cold air outbreak of January 24–31, 1951,** p. 20–25.

Nimbus, Volume 2, Number 5, Jan.–March 1950.

Escobar Vallejo, Ismaél: **Anteproyecto para el Observatorio de Física Cósmica en Chacaltaya,** [Preliminary plan for a cosmic physics observatory at Chacaltaya], p. 3–23.

Hernández, Haydée: **Ciclo meteorológico,** [Meteorological cycle], p. 24–25.

Moreno P., Claudio: **El ambiente del vuelo en relación al progreso aeronáutico,** [Flying atmosphere in relation to progress in aeronautics], p. 26–33.

Braun, Otto: **La irregularidad de las precipitaciones y la agricultura,** [Irregularity of precipitation and agriculture], p. 34–36.

Nimbus, Volume 2, Numbers 6, 7, April–September 1950.

Stenz, Edward: **Condiciones climatológicas del Altiplano de Bolivia,** [Climatological conditions of the Bolivian Altoplano], p. 3–23.

Yepes, José: **Definición de ambientes naturales en el Altiplano,** [Definition of natural conditions in the Altoplano], p. 24–31.

Moreno, Claudio: **El ambiente del vuelo en relación al progreso aeronautico,** [The ambient conditions of flight in relation to aeronautical progress], p. 32–36.

Serra, Adalberto: **Método gráfico de pronóstico,** [Graphic method of prognosis], p. 37–40.

Zabaleta, Julio: **La temperatura en la ciudad de Oruro,** [The temperature in the city of Oruro], p. 41–56.

Schroeder, Gert: **Mediciones de la electricidad atmosférica de la Misión Cientifica Alemana en la Universidad Mayor de San Andrés, La Paz, Bolivia,** [Measurement of atmospheric electricity by the German Scientific Mission in the Universidad Mayor de "San Andrés," La Paz, Bolivia], p. 57–58.

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Observations on Antarctic Whaling Ground (1948–1949), p. 142–173.

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Hidaka, Koji: **Mass transport in convection currents and the lateral mixing,** p. 175–184.

Hanzawa, Masao: **Oceanographical considerations on the bad rice crop in the Tohoku District of Japan (synthetic review),** p. 194–203.

Oceanographical Magazine, Tokyo, Volume 2, Number 1, March 1950. (All articles in English)

Unoki, S.: **On the variation of sea level caused by the variation of atmospheric pressure,** p. 1–15.

Hidaka, K.: **Surface contours due to wind-driven currents in an enclosed ocean,** p. 17–26.

Hidaka, K.: **Effect of land barriers upon the wind-driven currents in the ocean,** p. 27–29.

Hidaka, K.: **An attempt to determine the motionless layers in the ocean,** p. 31–34.

Polar Record, Volume 5, Number 39, January 1950.

Hagger, A. J.: **Air navigation in high latitudes,** p. 440–449.

Establishment of the Seward Glacial Research Station, 1948, p. 456–458.

Danish Pearyland Expedition, 1948–49, p. 458–459.

Ronne Antarctic Research Expedition, 1946–48, p. 459–461.

Roberts, Brian: **Norwegian-British-Swedish Antarctic Expedition, 1949–52,** p. 463–466.

Armstrong, Terence: **Study of sea ice in the Soviet Arctic, 1920–45,** p. 468–473.

Armstrong, Terence: **Recent Soviet interest in Bellingshausen's Antarctic voyage of 1819–21,** p. 475–478.

Polar Record, Volume 5, Number 40, July 1950.

Crawford, A. B.: **Establishment of the South African Meteorological Station on Marion Island, 1947–48,** p. 576–579.

Reece, Alan: **Analysis of sledge journeys,** p. 585–588.

Establishment of joint Canadian-United States meteorological stations in the Canadian Arctic, 1947–49, p. 602–605.

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Schindler, Gerhard: **Polarforschung vor mehr als 200 Jahren,** [Polar research more than 200 years ago], p. 280–281.

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Loewe, Fritz: **Neues aus der Antarktis,** [News from the Antarctic], p. 296–297.

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Tyler, A. G. and Kell, E. B.: **Upper air analysis and prognosis at 20Z,** p. 5–11.

Loewe, F.: **"Difficult days" at Melbourne,** p. 12–27.

Radok, U.: **Report on a flight investigation of lee wave disturbances near Melbourne,** p. 28–39.

Mitchell, L. R.: **Arctic or Antarctic and polar fronts,** p. 40–50.

Smith, R.: **The release of radiosonde balloons,** p. 51–55.

PART IV. AUTHOR AND SUBJECT INDEX

In this section will be found reference to the numbers given at the head of each abstract or entry. In Part I each entry begins with the number 2.3–, and in the bibliography on Soil Temperature (Part II) each entry begins with the number and letter 2C–. This index is divided into three parts:

Index of Authors Index of Subjects Index of Geographical Locations.

INDEX OF AUTHORS

Abbe, C., 2C–23
Abbey, R. L., 2.3–177
Adel, Arthur, 2.3–86
Agarwala, K. S., 2.2–139
Albrecht, Fritz, 2.3–79, 2C–107
Ambrosetti, Fl., 2.3–83
Amelung, W., 2.3–164
Anderson, Alfred B. C., 2C–120
Anderson, H. W., 2C–147
Andrews, J. P., 2C–92
Aniol, R., 2.3–113
Appolonia, E. d' *see* d'Appolonia, E.
Arléry, R., 2C–167
Arndt, W. J., 2C–125
Atkinson, H. B., 2C–108

Baer, M., 2C–1
Balakov, V. V., 2.3–43
Balls, W. L., 2C–174
Baranov, S., 2.3–157
Barlow, G. E., 2.3–177
Bay, C. E., 2C–108
Becker, F., 2C–86
Belotelkin, D. T., 2C–113
Bener, Paul, 2.3–20
Benfield, A. E., 2C–175
Benkelman, A. C., 2C–60, 2C–66, 2C–67
Berggren, W. P., 2C–126
Bergsten, Folke, 2.3–118
Bernard, Étienne, 2C–188
Beskow, Gunnar, 2C–72
Bezold, W. von *see* von Bezold, W.
Bilham, E. G., 2C–93
Bintig, Paul, 2.3–110
Birch, Francis, 2C–155
Bleeker, W., 2.3–67
Bliss, Donald E., 2C–139
Bois, Ch., 2.3–153
Bornschein, H., 2.3–158
Bosazza, V. L., 2.3–147
Bouyoucos, G. J., 2C–36, 2C–43, 2C–44, 2C–52, 2C–156
Braak, C., 2C–190
Bricard, J., 2.3–84, 2.3–172
Briggs, Lyman, J., 2C–16
Brooks, Charles F., 2C–191
Brooks, Douglas Lee, 2.3–88
Brose, Karl, 2.3–148
Brumshteĭn, V. I., 2.3–159
Brun, M. E., 2C–176
Brunt, Sir David, 2.3–9
Bryan, R., 2C–148
Büdel, Auguste, 2.3–18
Bundgaard, R. C., 2.3–36
Burmester, H., 2C–33
Burrill, Meredith F., 2C–127
Burton, V. R., 2C–60, 2C–67
Bykov, G. E., 2C–94

Cailleux, A., 2C–157
Calef, Wesley, 2.3–89
Callendar, H. L., 2C–9, 2C–10
Casagrande, A., 2C–68
Chalié, L., 2.3–76
Champion, D. L., 2C–95
Chapman, Sydney, 2.3–49
Charnock, H., 2.3–54
Chasovnikov, G. N., 2C–96
Cheng, Chwen-shu, 2.3–33
Chiplonkar, M. W., 2.3–178
Chudnovskiĭ, A. F., 2C–169, 2C–189
Church, J. S., 2C–114
Church, Phil E., 2.3–23
Clarke, W. J., 2.3–7
Cornford, E. C., 2.3–41
Court, Arnold, 2C–168
Cowling, T. G., 2.3–85
Craig, Robert W., 2.3–10
Cunningham, Robert M., 2.3–93
Curé, P., 2.3–156

Dady, G., 2.3–116
Daigo, Y., 2.3–17, 2.3–19
Dallas, W. L., 2C–17
d'Appolonia, E., 2C–151
Daubenmire, R. F., 2C–128
Davitian, G. S., 2C–149
DeCoste, J. B., 2.3–7
Deguillaume, M., 2.3–94
Demchinskiĭ, B., 2C–110
Dessens, H., 2.3–120
Diem, M., 2.3–22
Dieterichs, Heinz, 2.3–168

LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or related fields and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted.

In this list the preferred form of title entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organizations follows the title. If the title is not distinctive (for instance, Bulletin, Journal, Trudy, Mitteilungen), the entry consists of the issuing body followed by the title.

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TABLE OF CONTENTS

Meteorological Abstracts and Bibliography. Volume 2, Number 3, March 1951

Foreword ii
Notes on progress in Meteorological Literature; Introduction iii
Explanations iv

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

General Meteorology 173
Meteorological Observations and Instruments 175
Methods of Observation 175
Instruments 175
Synoptic Analysis and Forecasting 177
Structure and Physics of the Atmosphere 180
Structure of the Atmosphere 180
Upper Atmosphere—Ionosphere 181
Mechanics and Thermodynamics of the Atmosphere 182
General Circulation 184
Atmospheric Disturbances 185
Radiation and Temperature 187
Radiation 187
Temperature 189
Atmospheric Pressure and Wind 191
Pressure 191
Turbulence 192
Wind 193
Aqueous Vapor and Hydrometeors 194
Water Vapor and Clouds 194
Precipitation 197
Hydrometeorology 198
Climatology and Bioclimatology 200
Climatology 200
Climatic Variations 200
Bioclimatology—Applied Climatology 202
Miscellaneous Applications 204
Optical Phenomena 204
Electrical Phenomena 205
Acoustical Phenomena 206

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON SOIL TEMPERATURE

Outline of Contents 207
Soil Temperature 209
Supplementary Material 231

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS 233

PART IV. AUTHOR AND SUBJECT INDEXES

Index of Authors 240
Index of Subjects 243
Index of Geographical Locations 247

List of Periodicals ..... Cover 3